

Service Manual

 **PIONEER®**
The Art of Entertainment

ORDER NO.
ARP2435

FM/AM DIGITAL SYNTHESIZER TUNER

F-93

HEWZI

- Refer to the service manual ARP2221 for F-93.
- This manual is applicable to F-93/HEWZI.

CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- Part without part number cannot be supplied.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

F-93/HEWZI and F-93/HEWZ have the same construction except for the following:

Mark	Symbol & Description	Part No.		Remarks
		F-93/HEWZ	F-93/HEWZI	
	Operating instructions (Italian) Rear panel Non supply	ARC1352 Non supply	

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FO JAN. 1992 Printed in Japan

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ORDER NO.
ARP2221

FM/AM DIGITAL SYNTHESIZER TUNER

F-93

F-93 HAS THE FOLLOWING :

Type	Power Requirement	Remarks
KU/CA	AC 120 V only	
HEWZ	AC 220-230 V, AC 230-240 V(switchable)*	
HE	AC 220-230 V, AC 230-240 V(switchable)*	
HB	AC 220-230 V, AC 230-240 V(switchable)*	
SD	AC 110 V, 120 V-127 V, 220 V, 240 V(switchable)	

* Change the connection with the primary wire of the power transformer.

- This manual is applicable to the KU/CA, HEWZ, HE, HB and SD types.
- As to the HEWZ, HE, HB and SD types, refer to page 59.
- Ce manuel pour le service comprend les explications de réglage en français.
- Este manual de servicio trata del método ajuste escrito en español.

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This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5).

When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

1. SAFETY INFORMATION

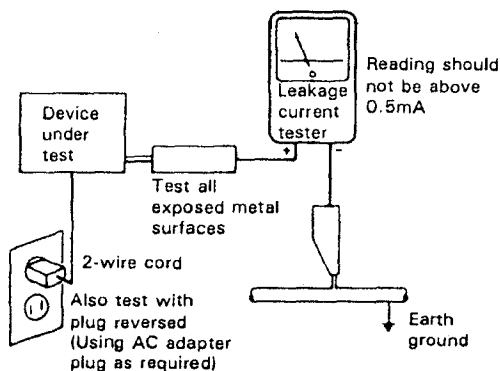
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a Δ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

2. EXPLODED VIEWS, PACKING AND PARTS LIST

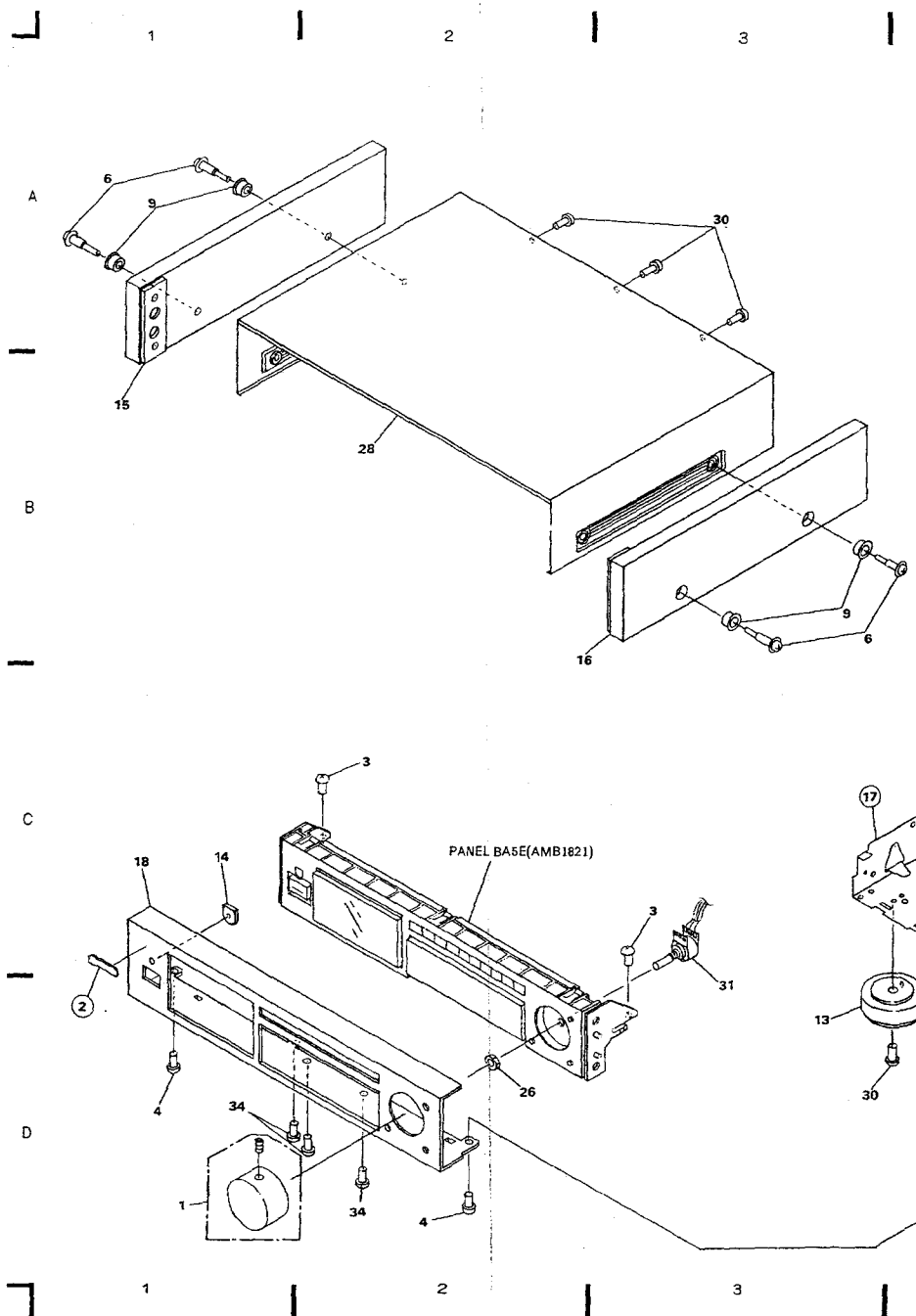
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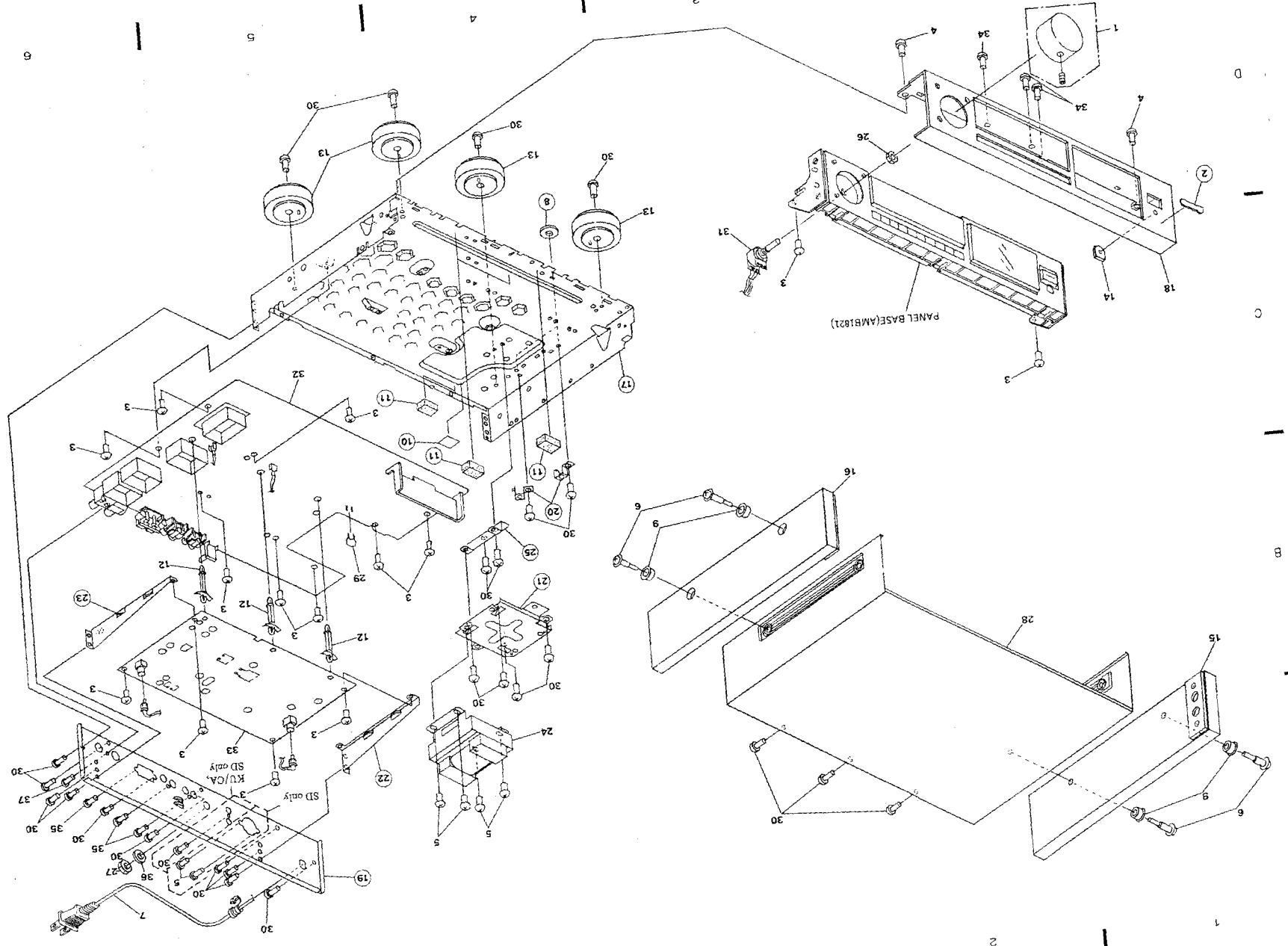
- Parts without part number cannot be supplied.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

2.1 EXTERIOR SECTION

Parts List of Exterior

Mark	No.	Description	Parts No.
	1	ROTARY KNOB	AAB1232
	2	NAME PLATE (METAL)	
	3	SCREW (STEEL)	ABA1011
	4	SCREW (STEEL)	ABA1048
	5	SCREW	ABA1074
Δ	6	SCREW (STEEL)	ABA1086
	7	AC POWER CORD	ADG1057
	8	SPACER	
	9	WOOD COLLAR	AEC1165
	10	BARRIER	
	11	SPACER	
	12	SPACER SUPPORT	AEP-182
	13	FOOT	AMR1159
	14	INDICATING LENS	AMR1160
	15	SIDE BOARD L	AMS1054
	16	SIDE BOARD R	AMS1055
	17	CHASSIS	
	18	FRONT PANEL	ANB1469
	19	REAR PANEL	
	20	PCB HOLDER	
	21	TRANS. HOLDER	
	22	HOLDER C	
	23	HOLDER D	
Δ	24	T701 POWER TRANSFORMER	ATT1156
	25	HOLDER	
	26	NUT	NK70FUC
	27	NUT	NK90FUC
	28	BONNET	PYY1098
	29	C723 CKA (0.01/AC150V)	ACG1005
	30	SCREW (STEEL)	ABA1009
	31	S801 ROTARY ENCODER	ASX1011
	32	TUNER ASSEMBLY	AWZ3501
	33	IF ASSEMBLY	AWZ3819
	34	SCREW	BBZ30P080FZK
	35	SCREW	ABA1047
	36	WASHER	WA92F140U100
	37	SCREW	VMZ30P060FCU

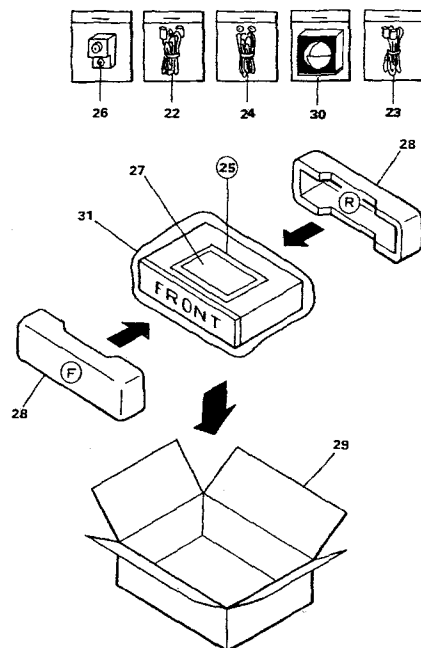




2.2 FRONT PANEL SECTION AND PACKING

Parts List of Front Panel and Packing

Mark	No.	Description	Parts No.
	1	KNOB (PLASTIC)	AAD1016
	2	LIGHT ACTION BUTTON	AAD1733
	3	KNOB	AAD1971
	4	FL FILTER	AAK1300
	5	PANEL(PVC)	AAK2191
	6	PANEL	AAK2158
	7	PANEL BASE	AMB1821
	8	HINGE L	
	9	HINGE R	
	10	MAGNET PLATE	ANG1558
	11	EJECT ASSEMBLY	AWL1081
	12	SHAFT ASSEMBLY L	AWL1082
	13	SHAFT ASSEMBLY R	AWL1083
	14	DOOR PANEL	ANB1468
	15	DISPLAY ASSEMBLY	AWZ3318
	16	SCREW	PBZ20P040FZK
	17	SCREW	BPZ26P080FMC
	18	SCREW (STEEL)	ABA1009
	19	SCREW	BPZ30P080FZK
	20	MAGNET	AXX1016
	21	DUMPER	AXA1010
	22	PLUG CORD	ADE-081
	23	CORD WITH PLUG(MINI)	ADE-085
	24	FM ANTENNA	ADH-005
	25	LITERATURE BAG	
	26	RF TRANSFORMER	AKX-080
	27	OPE. INSTRUCTIONS(E)	ARB1328
	28	PAD	AHA1434
	29	PACKING CASE	AHD2063
	30	L BAR ANTENNA	ATB-086
	31	PACKING SHEET	AHG1017
	32	SPRING	ABH1073
	33	SCREW	ABA1125

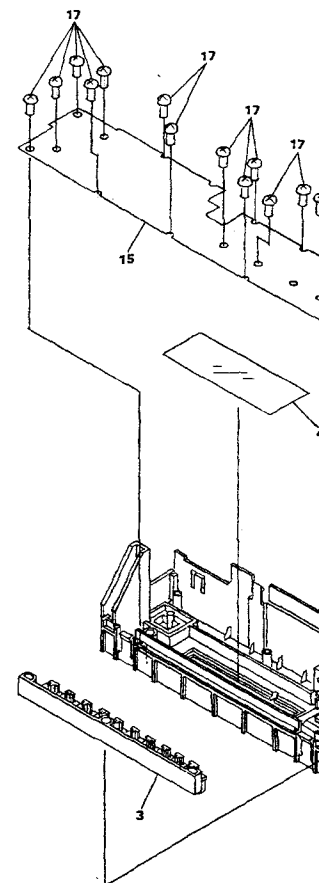
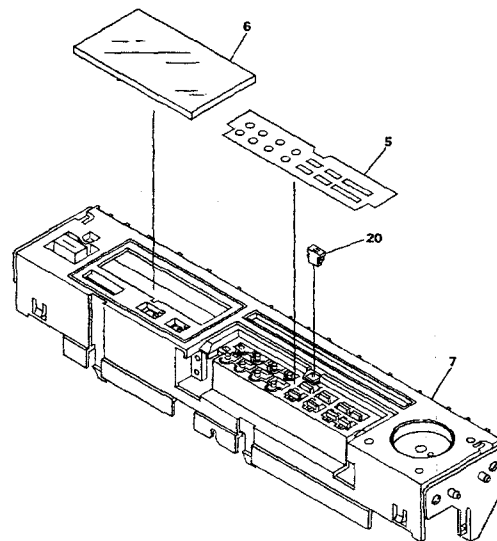


A

B

C

D



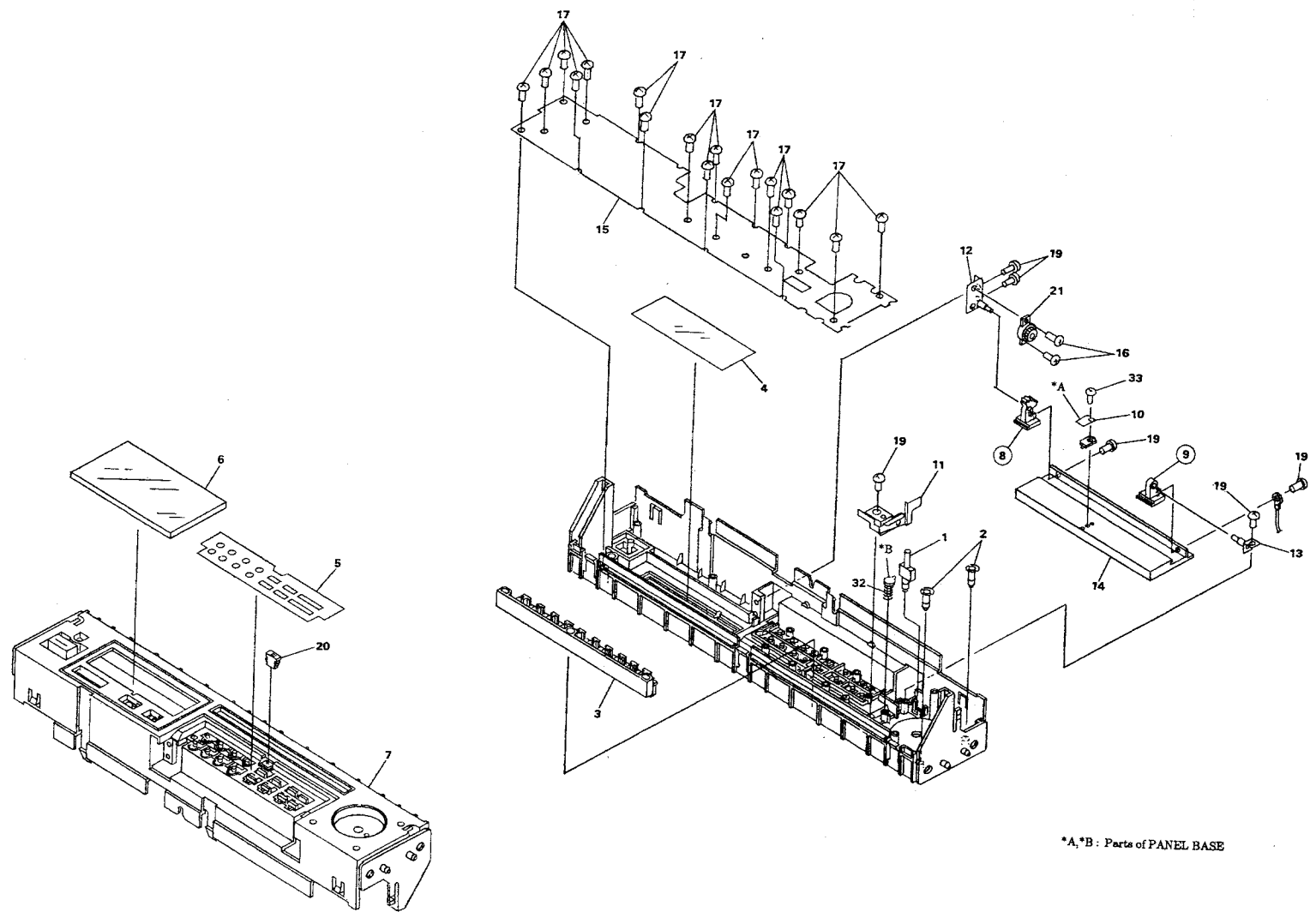
1 2 3 4 5 6

A

B

C

D



*A,*B: Parts of PANEL BASE

1 2 3 4 5 6

7

3. P.C.B.'s PARTS LIST

NOTES:

- Parts without part number cannot be supplied.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560 Ω 56 $\times 10^1$ 561 RD1/4PS561J

47k Ω 47 $\times 10^3$ 473 RD1/4PS473J

0.5 Ω 0R5 RD2H0R5K

1 Ω 010 RD1P010K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω 562 $\times 10^1$ 5621 RD1/4SR5621F

Mark	No.	Description	Parts No.	Mark	No.	Description	Parts No.
●FM VCO ASSEMBLY (AWC1004)				●TUNER ASSEMBLY (AWZ3501)			
SEMICONDUCTORS				SEMICONDUCTORS			
	Q8	TRANSISTOR	2SC2668		IC1, IC2	CXA1355L	
	Q9	MOS-FET	2SK241		IC201-IC203	FM IC	PA5008
					IC204, IC205	OP-AMP IC	RC4558DXP
	D3	VARI-CAP DIODE *1	KV1320-5		IC301, IC302	FM-NR	PA0042
					IC303-IC310	OP-AMP IC	RC4558DXP
COIL							
	L17	COIL	ATH-093		IC311-IC314	OP-AMP IC	UPC4570HA
	L18	COIL	ATC-077		IC315	OP-AMP IC	RC4558DXP
CAPACITORS					IC401	PLL SYNTHESIZER IC	CX-7925B
	C33	CERAMIC CAPACITOR	CKDYX103M25		IC501	AM IC	LA1247
	C34	CERAMIC CAPACITOR	CCDCH150J50		IC502	LOGIC IC	UPD4066BC
	C35	CERAMIC CAPACITOR	CCDCH330J50				
	C36	CERAMIC CAPACITOR	CCDCH010C50		IC601	MPX IC	PA5007
	C37	CERAMIC CAPACITOR	CCDTH080D50		IC701	REGULATOR IC	NJM78M56FAS
					IC801	TUNER CONTROL μ -COM	PD5161A
	C38	CERAMIC CAPACITOR	CCDSH120J50		Q1	TRANSISTOR	2SA1115
	C39	CERAMIC CAPACITOR	CCDSH330J50		Q2	TRANSISTOR	XDA124ES
	C40	CERAMIC CAPACITOR	CCDCH030C50		Q3	TRANSISTOR	2SC2705
	C42	CERAMIC CAPACITOR	CKDYX103M25		Q4	TRANSISTOR	2SC2603
RESISTORS					Q5	FET	3SK122
	All Resistors		RD1/8PM□□□J		Q6	N-FET	2SK161
●ENCODER ASSEMBLY (AWZ3321)					Q7	FET	3SK122
SWITCH					Q10, Q11	TRANSISTOR	XDC124ES
	S801	ROTARY ENCODER	ASX1011		Q201-Q204	N-FET	2SK246
CAPACITOR					Q205	TRANSISTOR	XDC124ES
	C811	CKA (0.01/25V)	ACG-036		Q206	TRANSISTOR	2SC2878
					Q207	N-FET	2SK246
					Q208	TRANSISTOR	2SC2603
					Q209	P-FET	2SJ103
					Q301	TRANSISTOR	2SA1145

*1; Specifications for D3-1 to D3-5 are matched. If you change D3-1 to D3-4, at the same time also change FM VCO assembly. Likewise, if you change FM VCO assembly, at the same time change D3-1 to D3-4.

In the case of both of the above mentioned, D3-1 to D3-4 parts are mounted on the newly ordered FM VCO assembly; use spare parts.

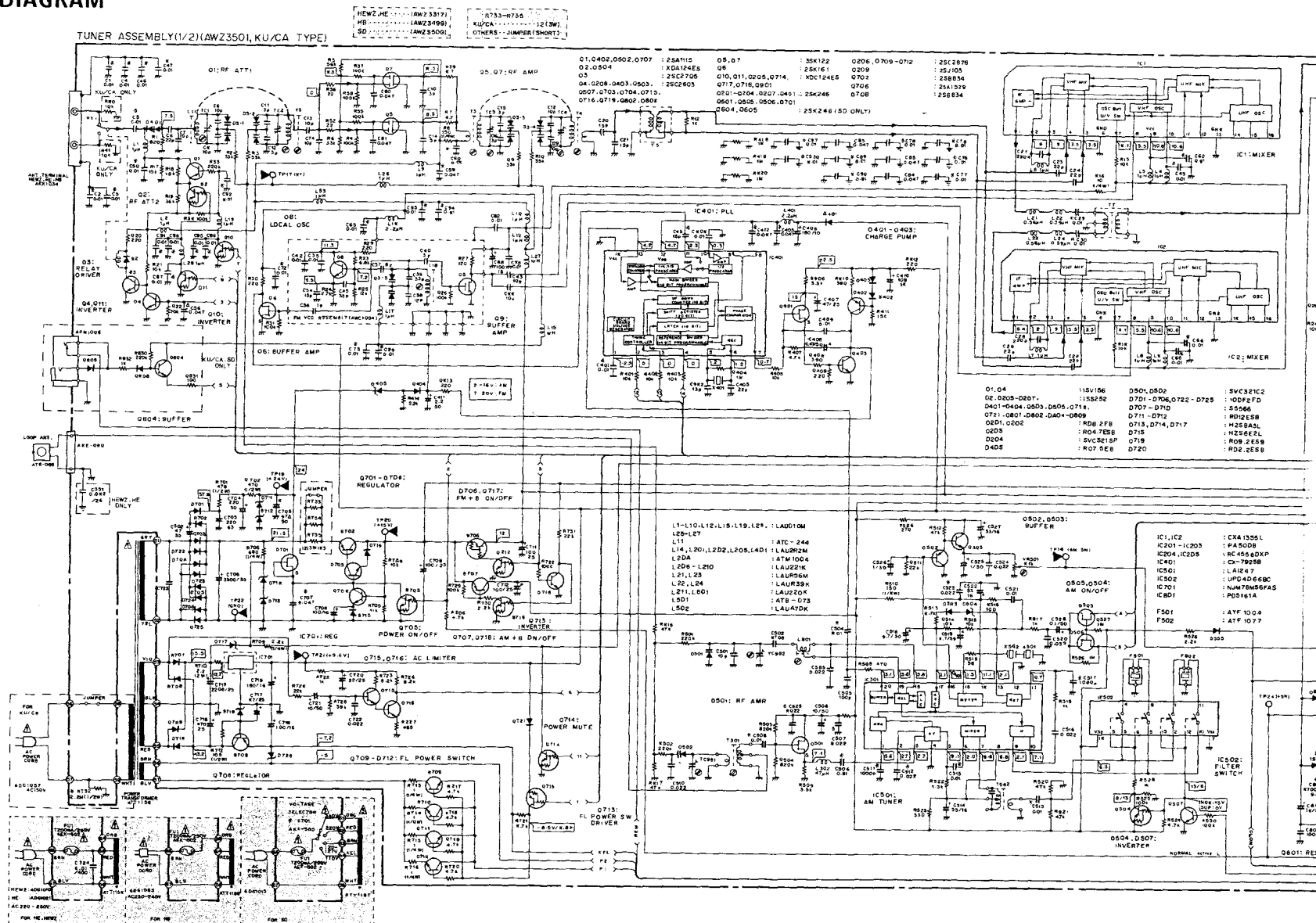
Mark	No.	Description	Parts No.	Mark	No.	Description	Parts No.
	Q302	TRANSISTOR	XDC143ES	RELAYS			
	Q303	TRANSISTOR	2SA1145		RY1	RELAY	ASR-087
	Q304	TRANSISTOR	XDC143ES		RY301	RELAY	ASR1018
	Q401	N-FET	2SK246		RY302	RELAY	ASR1018
	Q402	TRANSISTOR	2SA1115	COILS, FILTERS AND TRANSFORMERS			
	Q403	TRANSISTOR	2SC2603		L1-L10	AXIAL INDUCTOR	LAU010M
	Q501	N-FET	2SK246		L11	COIL	ATC-244
	Q502	TRANSISTOR	2SA1115		L12	AXIAL INDUCTOR	LAU010M
	Q503	TRANSISTOR	2SC2603		L14	AXIAL INDUCTOR	LAU2R2M
	Q504	TRANSISTOR	XDA124ES		L15,L19,L20	AXIAL INDUCTOR	LAU010M
	Q505,Q506	N-FET	2SK246		L21	AXIAL INDUCTOR	LAUR56M
	Q507	TRANSISTOR	2SC2603		L22	AXIAL INDUCTOR	LAUR39K
	Q601-Q603	N-FET	2SK117		L23	AXIAL INDUCTOR	LAUR56M
	Q701	N-FET	2SK246		L24	AXIAL INDUCTOR	LAUR39K
	Q702	TRANSISTOR	2SB834		L25-L27	AXIAL INDUCTOR	LAU010M
	Q703,Q704	TRANSISTOR	2SC2603		L201,L202	AXIAL INDUCTOR	LAU2R2M
	Q705	TRANSISTOR	XDC143ES		L204	COIL	ATM1004
	Q706	TRANSISTOR	2SA1529		L205	AXIAL INDUCTOR	LAU2R2M
	Q707	TRANSISTOR	2SA1115		L206-L210	AXIAL INDUCTOR	LAU221K
	Q708	TRANSISTOR	2SB834		L211	AXIAL INDUCTOR	LAU220K
	Q709-Q712	TRANSISTOR	2SC2878		L401	AXIAL INDUCTOR	LAU2R2M
	Q713	TRANSISTOR	XDA143ES		L501	IF TRANSFORMER	ATB-073
	Q714	TRANSISTOR	XDC124ES		L502	AXIAL INDUCTOR	LAU470K
	Q715,Q716	TRANSISTOR	2SC2603		L601	COIL	ATM1003
	Q717,Q718	TRANSISTOR	XDC124ES		L801	AXIAL INDUCTOR	LAU220K
	Q719	TRANSISTOR	2SC2603		F501	CERAMIC FILTER	ATF1004
	Q801	TRANSISTOR	XDC124ES		F502	CERAMIC FILTER	ATF1077
	Q802,Q804	TRANSISTOR	2SC2603		T2	RF TRANSFORMER	ATC-257
	D1,D4	DIODE	1SV156		T3	COIL	ATC-204
	D2	DIODE	1SS252		T4	RF TRANSFORMER	ATC-257
	D201,D202	ZENER DIODE	RD8.2FB		T5	RF TRANSFORMER	ATC-218
	D203	ZENER DIODE	RD4.7ESB		T7	IF TRANSFORMER	ATE1011
	D204	VARI-CAP DIODE	SVC321SP		T201,T202	IF TRANSFORMER	ATE-068
	D205-D207	DIODE	1SS252		T203	IF TRANSFORMER	ATE1010
	D301,D302	ZENER DIODE	RD8.2FB		T501	COIL	ATB-087
	D303-D307,D401-D404	DIODE	1SS252		T502	IF TRANSFORMER	ATB1002
	D405	ZENER DIODE	RD7.5EB	CAPACITORS			
	D501,D502	VARI-CAP DIODE	SVC321C2		C1-C5	CKA (0.01/25V)	ACG-036
	D503	DIODE	1SS252		C6	CERAMIC CAPACITOR	CCDCH220J50
	D504	ZENER DIODE	RD5.1ESB		C7	CERAMIC CAPACITOR	CCDCH100D50
	D505	DIODE	1SS252		C8,C9	CERAMIC CAPACITOR	CCDSH100D50
	D601	ZENER DIODE	RD8.2FB		C10	CERAMIC CAPACITOR	CCDCH030C50
	D701-D706	DIODE	10DF2FD		C11,C12	CERAMIC CAPACITOR	CCDSH030C50
	D707-D710	DIODE	S5566		C13	CERAMIC CAPACITOR	CCDSH100D50
	D711,D712	ZENER DIODE	RD12ESB		C14	CERAMIC CAPACITOR	CCDCH030C50
	D713,D714	ZENER DIODE	HZS9A3L		C15,C16	CERAMIC CAPACITOR	CCDSH030C50
	D715	ZENER DIODE	HZS6C2L		C18,C19	CERAMIC CAPACITOR	CCDSH100D50
	D716	DIODE	1SS252		C20,C21	CERAMIC CAPACITOR	CCDCH150J50
	D717	ZENER DIODE	HZS9A3L		C23-C26	CERAMIC CAPACITOR	CCDCH220J50
	D719	ZENER DIODE	RD8.2ESB		C27,C28	CERAMIC CAPACITOR	CCDSL221J50
	D720	ZENER DIODE	RD2.2ESB		C29,C30	CKA (0.01/25V)	ACG-036
	D721	DIODE	1SS252		C43,C44	CERAMIC CAPACITOR	CCDCH100D50
	D722-D725	DIODE	10DF2FD				
	D801,D802,D804-D809	DIODE	1SS252				

Mark	No.	Description	Parts No.	Mark	No.	Description	Parts No.
	C45	CERAMIC CAPACITOR	CCDCH150J50		C302	CKA (0.047/25V)	ACG-038
	C46, C47, C50	CKA (0.01/25V)	ACG-036		C303	ELECTROLYTIC CAPACIT	CEEA222M16
	C55, C59	CKA (0.047/25V)	ACG-037		C304	CKA (0.047/25V)	ACG-038
	C60, C62, C63, C65, C66, C69, C72, C73	CKA (0.01/25V)	ACG-036		C306	ELECTROLYTIC CAPACIT	CEEA222M16
	C74	CERAMIC CAPACITOR	CCDSH100D50		C307	CKA (0.047/25V)	ACG-038
	C75-C78	CKA (0.01/25V)	ACG-036		C308, C309	ELECTR. CAPACIT	CEEA100M25
	C80, C81	CERAMIC CAPACITOR	CKDYX473M25		C312, C313, C314, C315		
	C82	CERAMIC CAPACITOR	CKDYX103M25		C316	ELECTROLYTIC CAPACIT	CEANP100M25
	C83-C85	CKA (0.047/25V)	ACG-037		C317, C318	ELECTROLYTIC CAPACIT	CEAS6R8M50
	C86, C87	CKA (0.01/25V)	ACG-036		C319-C321	ELECTR. CAPACITOR	CEAS4R7M50
	C88	ELECTR. CAPACITOR	CEAS101M16		C322	ELECTROLYTIC CAPACIT	CEAS1R5M50
	C89-C98	CKA (0.01/25V)	ACG-036		C323, C324	ELECTR. CAPACITOR	CEAS010M50
	C99	CERAMIC CAPACITOR	CKDYX103M25		C325	ELECTROLYTIC CAPACIT	CEANP100M25
	C201, C202	CKA (0.01/25V)	ACG-036		C326-C330	ELECTR. CAPACITOR	CEAS010M50
	C203, C204	CKA (0.047/25V)	ACG-037		C331-C333	ELECTR. CAPACITOR	CEAS0R1M50
	C205	CKA (0.047/25V)	ACG-038		C334	POLYESTER CAPACITOR	CQMXA823J100
	C206	ELECTROLYTIC CAPACIT	CEEA102M16		C335	POLYESTER CAPACITOR	CQMXA223J100
	C207	CKA (0.047/25V)	ACG-038		C336	POLYESTER CAPACITOR	CQMXA683J100
	C209	ELECTROLYTIC CAPACIT	CEEA220M25		C337	POLYESTER CAPACITOR	CQMXA153J100
	C210	ELECTROLYTIC CAPACIT	CEEA222M16		C338	POLYESTER CAPACITOR	CQMXA563J100
	C211, C212	CKA (0.047/25V)	ACG-037		C339	POLYESTER CAPACITOR	CQMXA123J100
	C213	ELECTROLYTIC CAPACIT	CEEA102M16		C340	POLYESTER CAPACITOR	CQMXA393J100
	C214	CKA (0.047/25V)	ACG-037		C341	POLYESTER CAPACITOR	CQMXA103J100
	C215	CKA (0.047/25V)	ACG-038		C342	POLYESTER CAPACITOR	CQMXA333J100
	C217	ELECTROLYTIC CAPACIT	CEEA222M16		C343	POLYESTER CAPACITOR	CQMXA682J100
	C219	CKA (0.047/25V)	ACG-037		C344	POLYESTER CAPACITOR	CQMXA223J100
	C220	ELECTROLYTIC CAPACIT	CEEA220M25		C345	POLYESTER CAPACITOR	CQMXA562J100
	C222	PL.STYRENE CAPACITOR	CQSA821J50		C346	POLYESTER CAPACITOR	CQMXA183J100
	C223	CKA (0.01/25V)	ACG-036		C347	POLYESTER CAPACITOR	CQMXA392J100
	C224, C225	CKA (0.047/25V)	ACG-037		C348	POLYESTER CAPACITOR	CQMXA123J100
	C226	ELECTR. CAPACITOR	CEAS101M16		C349	POLYESTER CAPACITOR	CQMXA332J100
	C227	CKA (0.047/25V)	ACG-038		C350	POLYESTER CAPACITOR	CQMXA103J100
	C231	CKA (0.047/25V)	ACG-037		C351	POLYESTER CAPACITOR	CQMXA272J100
	C232	ELECTR. CAPACITOR	CEAS471M10		C352	POLYESTER CAPACITOR	CQMXA822J100
	C234	CERAMIC CAPACITOR	CCDCH220J50		C353	POLYESTER CAPACITOR	CQMXA182J100
	C235	ELECTR. CAPACITOR	CEAS010M50		C354	POLYESTER CAPACITOR	CQMXA682J100
	C236, C237	ELECTROLYTIC CAPACIT	CEANP100M25		C355	POLYESTER CAPACITOR	CQMXA152J100
	C240	ELECTR. CAPACITOR	CEAS010M50		C356	POLYESTER CAPACITOR	CQMXA472J100
	C241	PL.STYRENE CAPACITOR	CQSA471J50		C357	POLYESTER CAPACITOR	CQMXA122J100
	C242	ELECTR. CAPACITOR	CEAS2R2M50		C358	POLYESTER CAPACITOR	CQMXA392J100
	C243	CERAMIC CAPACITOR	CKDYX223M25		C359	PL.STYRENE CAPACITOR	CQSA821J50
	C244, C246	ELECTR. CAPACITOR	CEAS4R7M50		C360	POLYESTER CAPACITOR	CQMXA272J100
	C247, C248	CERAMIC CAPACITOR	CCDSL181J50		C361	PL.STYRENE CAPACITOR	CQSA681J50
	C249	CKA (0.01/25V)	ACG-036		C362	POLYESTER CAPACITOR	CQMXA222J100
	C250	ELECTR. CAPACITOR	CEAS470M16		C363	PL.STYRENE CAPACITOR	CQSA561J50
	C251	CKA (0.047/25V)	ACG-037		C364	POLYESTER CAPACITOR	CQMXA182J100
	C252	ELECTR. CAPACITOR	CEAS010M50		C365	PL.STYRENE CAPACITOR	CQSA391J50
	C254	CKA (0.047/25V)	ACG-037		C366-C373	PL.STYRENE CAPACITOR	CQSA103J50
	C255	ELECTR. CAPACITOR	CEAS010M50		C374, C375	POLYESTER CAPACITOR	CQMXA103J100
	C256	ELECTR. CAPACITOR	CEAS470M16		C376-C380, C383	CKA (0.047/25V)	ACG-037
	C257, C258	CERAMIC CAPACITOR	CCDSL181J50		C401	CKA (0.01/25V)	ACG-036
	C259-C264	CKA (0.047/25V)	ACG-037		C402	CERAMIC CAPACITOR	CCDCH150J50
	C265	CERAMIC CAPACITOR	CCDCH680J50		C403	CERAMIC CAPACITOR	CCDCH220J50
	C301	ELECTROLYTIC CAPACIT	CEEA102M16		C404	CKA (0.01/25V)	ACG-036
					C405	CKA (0.047/25V)	ACG-037

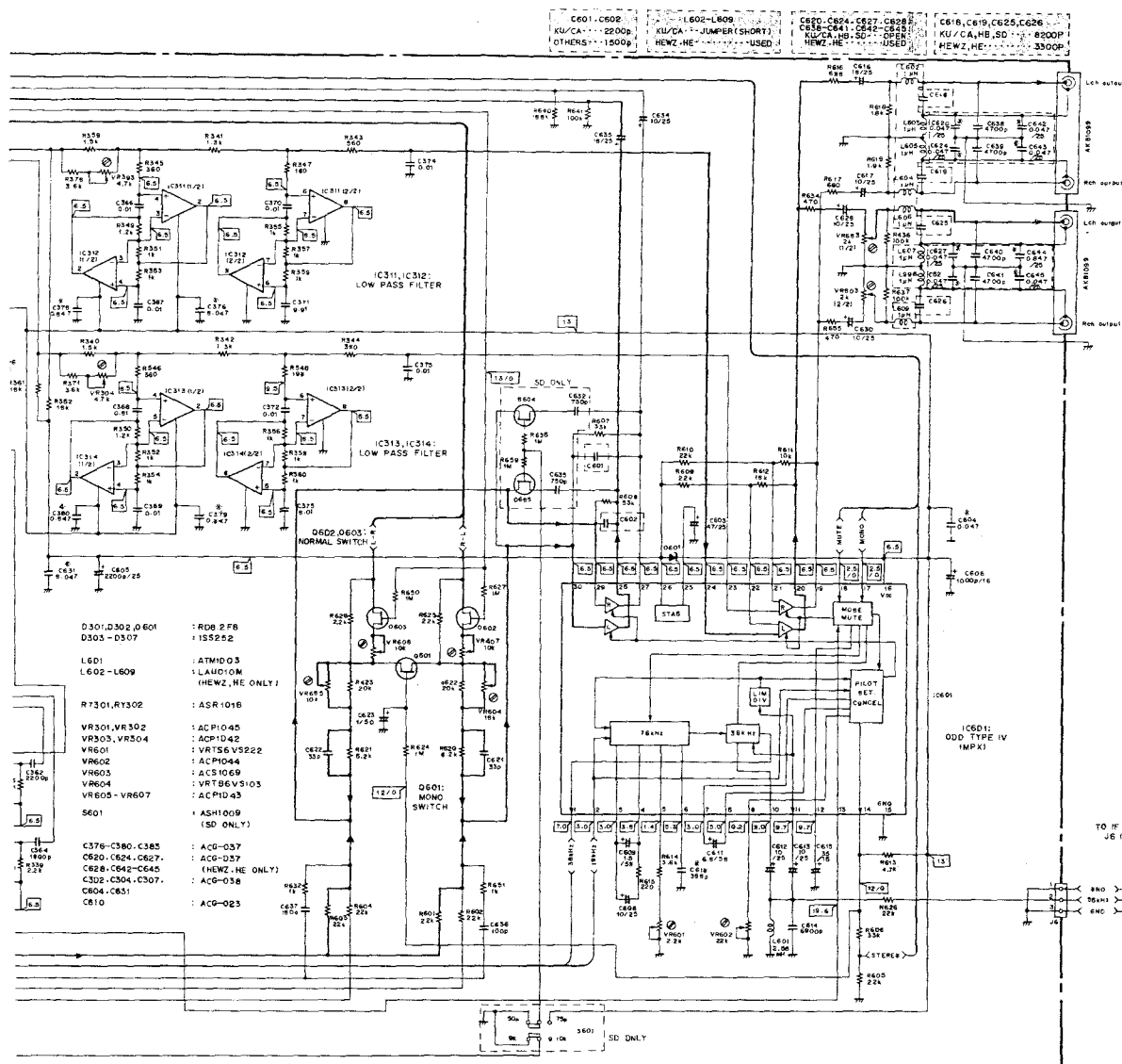
Mark	No.	Description	Parts No.	Mark	No.	Description	Parts No.
		R339-R362 CARBON FILM RESISTOR	RDR1/4PM□□□J	CAPACITORS			
		R363 CARBON FILM RESISTOR	RD1/4PM221J			C901,C902 CERAMIC CAPACIT(0.022μ)	ACG1022
		R366-R369 CARBON FILM RESISTOR	RDR1/6PU□□□J	RESISTORS			
		R370,R371 CARBON FILM RESISTOR	RDR1/4PM362J			R902,R903 CARBON FILM RESISTOR	RD1/4PM151J
		R374 CARBON FILM RESISTOR	RD1/4PM221J			Other Resistors	RD1/8PM□□□J
		R418-R420 CARBON FILM RESISTOR	RDR1/4PM105J	OTHERS			
		R510 CARBON FILM RESISTOR	RD1/4PM151J			V901 FL TUBE	AAV1121
		R517 CARBON FILM RESISTOR	RDR1/4PM102J	◎IF ASSEMBLY (AWZ3319)			
		R601-R604 CARBON FILM RESISTOR	RDR1/4PM223J	SEMICONDUCTORS			
		R607-R612 CARBON FILM RESISTOR	RDR1/4PM□□□J			IC101-IC109 AMPLIFIER IC	TA7060AP
		R614 METALFILM RESISTER	RN1/4PQ5601F			IC110 FM IC	PA5008
		R616-R623 CARBON FILM RESISTOR	RDR1/4PM□□□J			IC931-IC939 OP-AMP IC	RC4558DXP
		R625 CARBON FILM RESISTOR	RDR1/4PM222J			Q101,Q102 TRANSISTOR	XDA143ES
		R628 CARBON FILM RESISTOR	RDR1/4PM222J			Q103,Q104 TRANSISTOR	2SC2668
		R634-R637 CARBON FILM RESISTOR	RDR1/4PM□□□J			Q105 TRANSISTOR	XDC124ES
		R701,R702 CARBONFILM RESISTOR	RD1/2PM471J			Q106,Q107 TRANSISTOR	2SC2603
		R703 CARBON FILM RESISTOR	RD1/4PM681J			Q108-Q110 MOS-FET	2SK241
		R709 CARBON FILM RESISTOR	RD1/4PM222J			Q111-Q114 TRANSISTOR	2SC2668
		R710 METAL OXIDE RESISTOR	RS2LMF2R2J			Q115 TRANSISTOR	2SC2603
		R712 CARBONFILM RESISTOR	RD1/2PM101J			D101-D112 DIODE	1SS85
		R713-R716 CARBON FILM RESISTOR	RD1/4PM010J			D113,D114 DIODE	2-1K261
		R732 RESISTOR(2.2M, 1/2W)	ACN-208			D160,D161 DIODE	1SV156
		R733-R735 METAL OXIDE RESISTOR	RS3LMF120J	COILS, FILTERS AND TRANSFORMERS			
		R812 CARBON FILM RESISTOR	RD1/4PM101J			L101,L102 AXIAL INDUCTOR	LAU2R2M
		R820 RESISTOR ARRAY(22K)	RA8T223J			L103,L105,L108 AXIAL INDUCTOR	LAU221K
		R825 RESISTOR ARRAY(22K)	RA8T223J			L160,L161 AXIAL INDUCTOR	LAU100K
		Other Resistors	RD1/8PM□□□J			L162 AXIAL INDUCTOR	LAU2R2M
OTHERS						F101-F108 CERAMIC FILTER	ATF1080
		CN1 CONNECTOR(12P)	KPE12			F109 CERAMIC FILTER	ATF1079
		CN2 CONNECTOR(13P)	KPE13			F110-F112 CERAMIC FILTER	ATF-119
		CN3 CONNECTOR(4P)	KPE4			F113,F114 CERAMIC FILTER	ATF1079
		CN4 CONNECTOR(4P)	KPE4			T101-T106 IF TRANSFORMER	ATE-063
		CN5 CONNECTOR(4P)	KPE4	CAPACITORS			
		J PLUG CORD	ADE1111			C101 CKA (0.01/25V)	ACG-036
		X401 CRYSTAL RESONATOR	ASS1005			C102,C103 CKA (0.047/25V)	ACG-037
		X501 CERAMIC RESONATOR	ATF1027			C104,C105 CKA (0.01/25V)	ACG-036
		X502 CERAMIC RESONATOR	ATF1027			C106 CKA (0.047/25V)	ACG-037
		X801 CERAMIC RESONATOR	ASS1055			C107 CKA (0.01/25V)	ACG-036
		SCREW (STEEL)	ABA1009			C108-C110 CKA (0.047/25V)	ACG-037
		PIN JACK(2P)	AKB1099			C111,C112 CKA (0.01/25V)	ACG-036
		TERMINAL 2-P	AKE-060			C113 CKA (0.047/25V)	ACG-037
		JACK	AKN1006			C114 CKA (0.01/25V)	ACG-036
		SCREW	BBZ30P080FCU			C115-C117 CKA (0.047/25V)	ACG-037
◎DISPLAY ASSEMBLY (AWZ3318)						C118 CERAMIC CAPACITOR	CCDCH101J50
SEMICONDUCTORS						C119 CKA (0.01/25V)	ACG-036
		IC901-IC903 FL STATIC DRIVER IC	LC7570			C120-C131 CKA (0.047/25V)	ACG-037
		D901-D904 DIODE	1SS252			C133-C138 CKA (0.047/25V)	ACG-037
		D905 LED(RED,AMBER)	AEL1115			C160,C161 CERAMIC CAPACITOR	CKDYX473M25
SWITCHES							
		S901-S929 SWITCH	ASG1029				

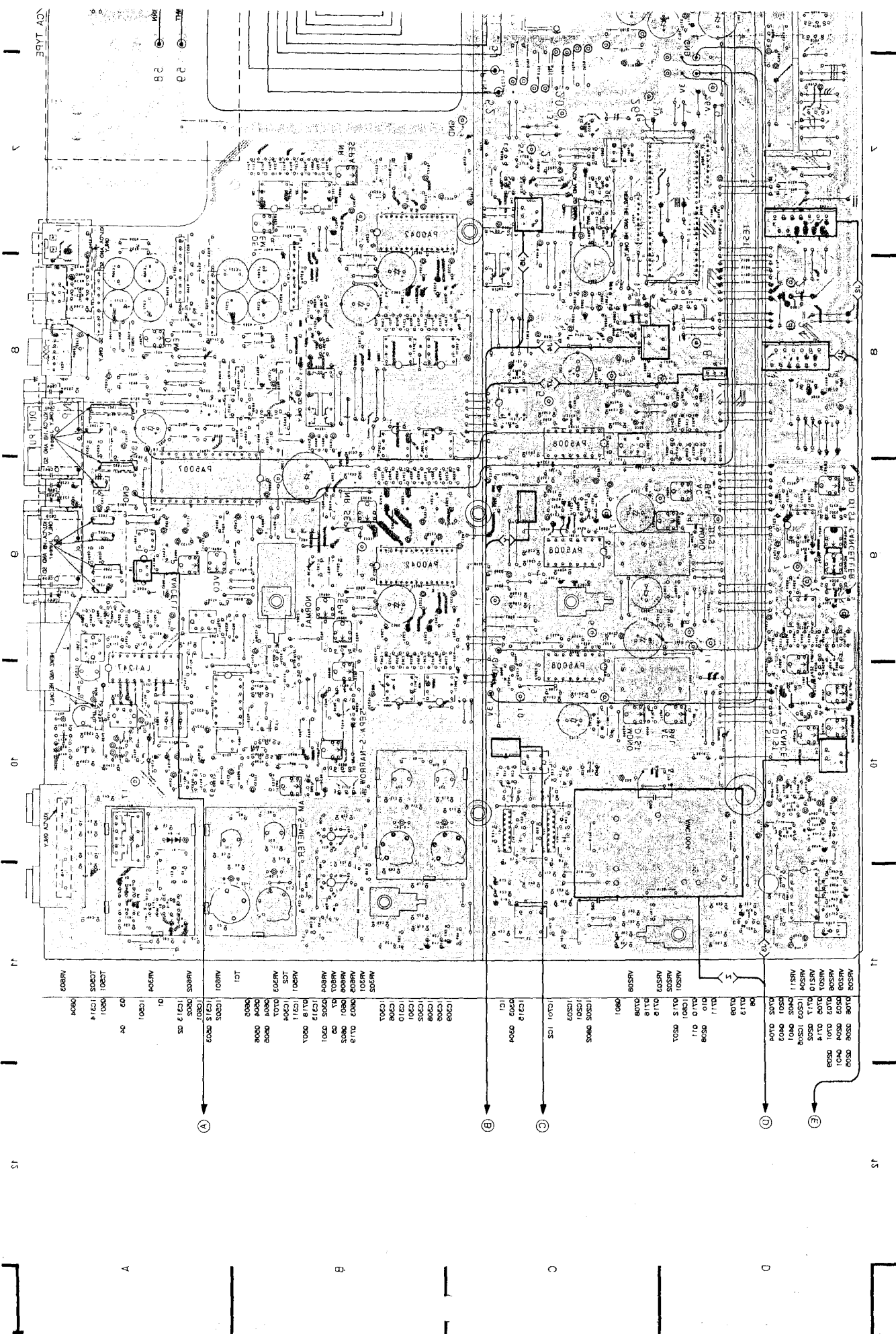
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				OTHERS			
	C162	CERAMIC CAPACITOR	CKDYX103M25		CN6	CONNECTOR(3P)	KPE3
	C163, C164	CERAMIC CAPACITOR	CKDYX473M25		TH101	THERMISTOR	TH102-2
	C165	CERAMIC CAPACITOR	CKDYX103M25		TH102	THERMISTOR	TH102-2
	C166, C167	CERAMIC CAPACITOR	CKDYX473M25		PIN JACK	(1P)	AKB1062
	C168	ELECTR. CAPACITOR	CEAS470M10				
	C169-C172	CERAMIC CAPACITOR	CKDYX473M25				
	C173	ELECTR. CAPACITOR	CEAS101M16				
	C174	CERAMIC CAPACITOR	CKDYX473M25				
	C175	CKA (0.047/25V)	ACG-037				
	C176-C178	CERAMIC CAPACITOR	CKDYX103M25				
	C931, C932	MYLOR FILM CAPACITOR	CQMA103J50				
	C933	ELECTR. CAPACITOR	CEAS470M16				
	C934, C935	MYLOR FILM CAPACITOR	CQMA103J50				
	C936	ELECTR. CAPACITOR	CEAS470M16				
	C937, C938	MYLOR FILM CAPACITOR	CQMA103J50				
	C939	ELECTR. CAPACITOR	CEAS470M16				
	C940, C941	MYLOR FILM CAPACITOR	CQMA103J50				
	C942	ELECTR. CAPACITOR	CEAS470M16				
	C943, C944	MYLOR FILM CAPACITOR	CQMA103J50				
	C945	ELECTR. CAPACITOR	CEAS470M16				
	C946, C947	MYLOR FILM CAPACITOR	CQMA103J50				
	C948, C949	ELECTR. CAPACITOR	CEAS470M16				
	C950	PL. STYRENE CAPACITOR	CQSA182J50				
	C951, C952	PL. STYRENE CAPACITOR	CQSA821J50				
	C953	PL. STYRENE CAPACITOR	CQSA162J50				
	C954	ELECTR. CAPACITOR	CEAS470M16				
	C955	ELECTR. CAPACITOR	CEAS010M50				
	C956	ELECTR. CAPACITOR	CEAS101M16				
	C958	ELECTR. CAPACITOR	CEAS470M16				
	C960	PL. STYRENE CAPACITOR	CQSA182J50				
	C961, C962	PL. STYRENE CAPACITOR	CQSA821J50				
	C963	PL. STYRENE CAPACITOR	CQSA162J50				
	C964	ELECTR. CAPACITOR	CEAS470M16				
	C965	ELECTR. CAPACITOR	CEAS010M50				
	C966	ELECTR. CAPACITOR	CEAS101M16				
	C967	MYLOR FILM CAPACITOR	CQMA102J50				
	C968	MYLOR FILM CAPACITOR	CQMA223J50				
	C969	CKA (0.01/25V)	ACG-036				
RESISTORS							
	VR101	VR(10K)	ACP1043				
	VR102	VR(2.2K)	ACP1041				
	VR932	VR(22K)	ACP1044				
	R109	CARBON FILM RESISTOR	RD1/4PM151J				
	R118	CARBON FILM RESISTOR	RD1/4PM151J				
	R127	CARBON FILM RESISTOR	RD1/4PM151J				
	R130	CARBON FILM RESISTOR	RD1/4PM151J				
	R133	CARBON FILM RESISTOR	RD1/4PM151J				
	R136	CARBON FILM RESISTOR	RD1/4PM151J				
	R139	CARBON FILM RESISTOR	RD1/4PM151J				
	R163	CARBON FILM RESISTOR	RD1/4PM151J				
	R168	CARBON FILM RESISTOR	RD1/4PM151J				
	Other Resistors		RD1/8PM□□□J				

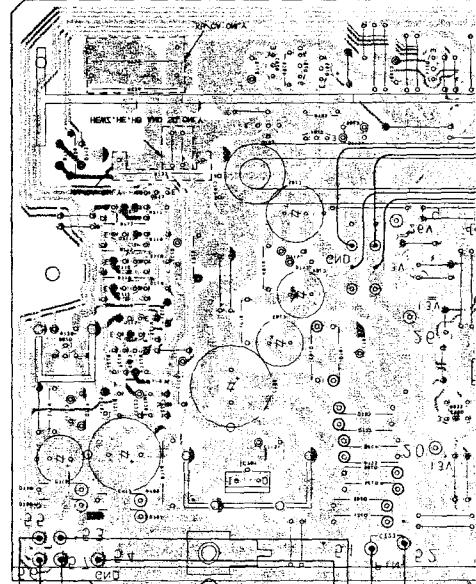
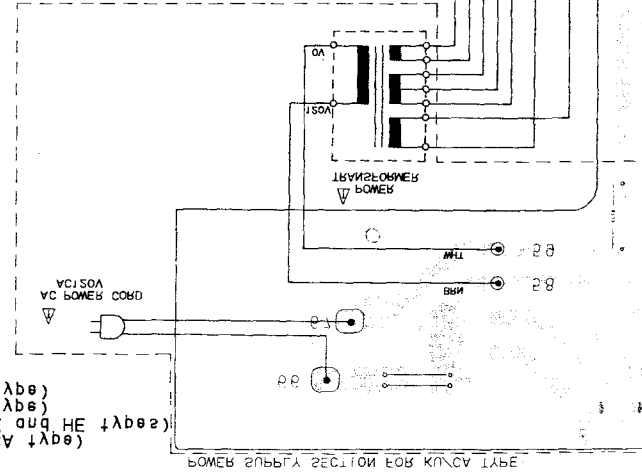
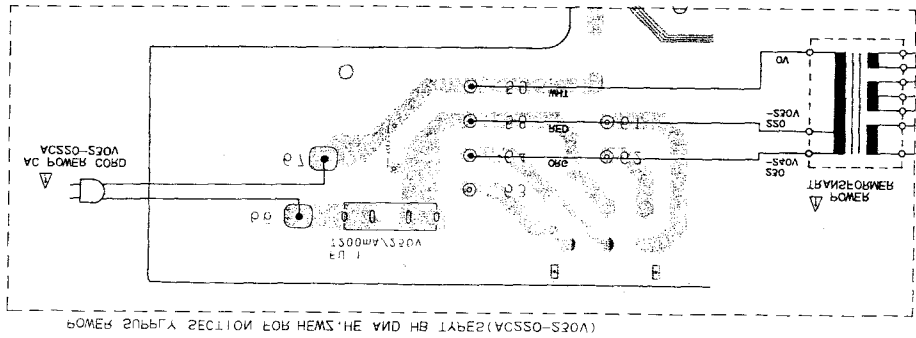
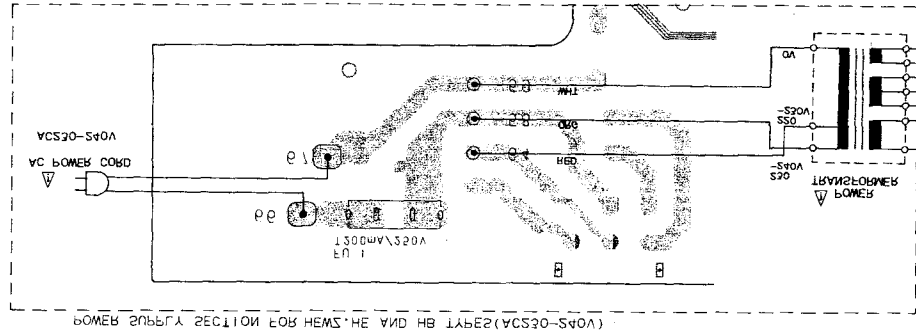
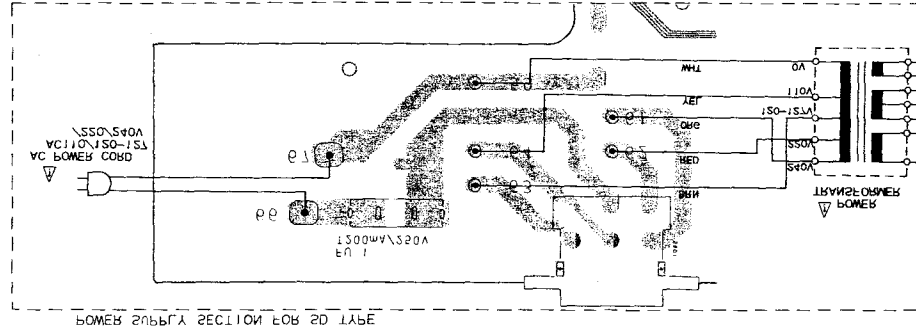
TUNER ASSEMBLY(1/2)(AWZ3501.KU/CA TYPE)





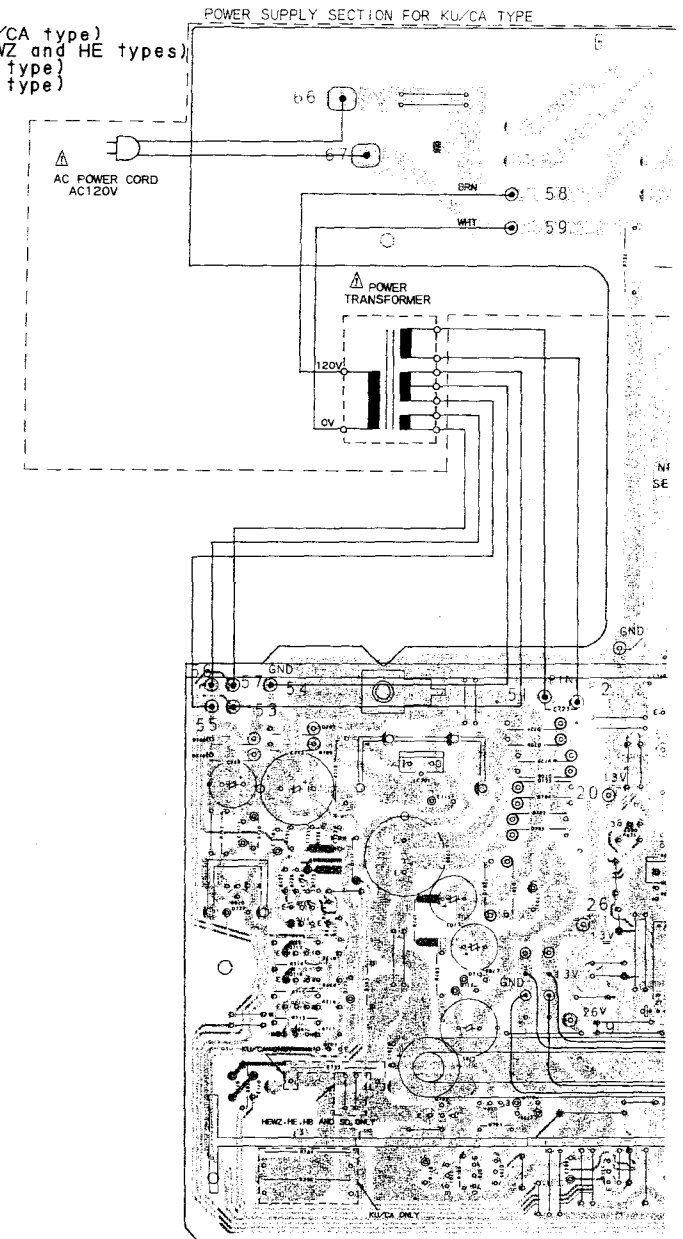
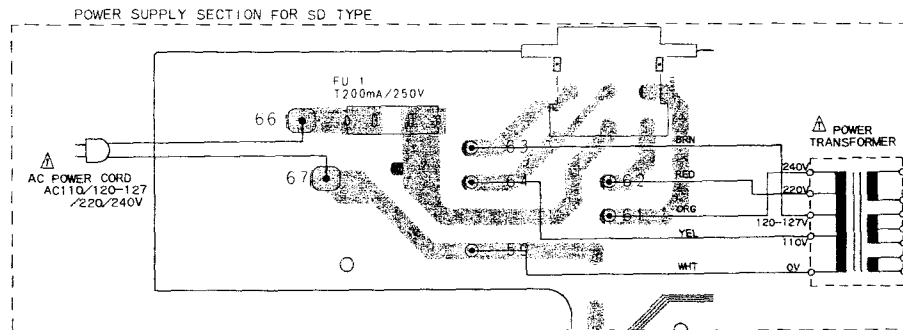
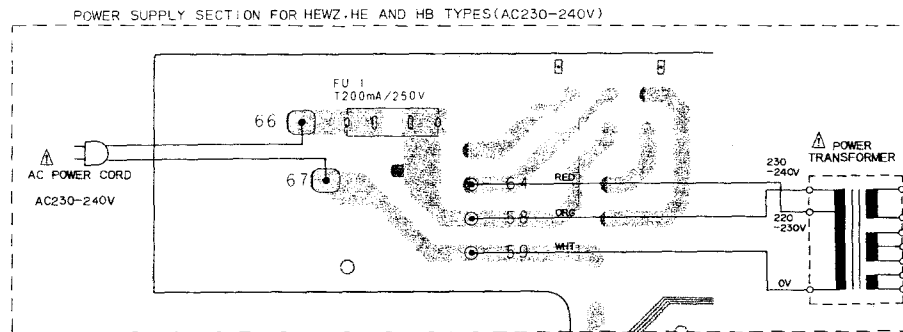
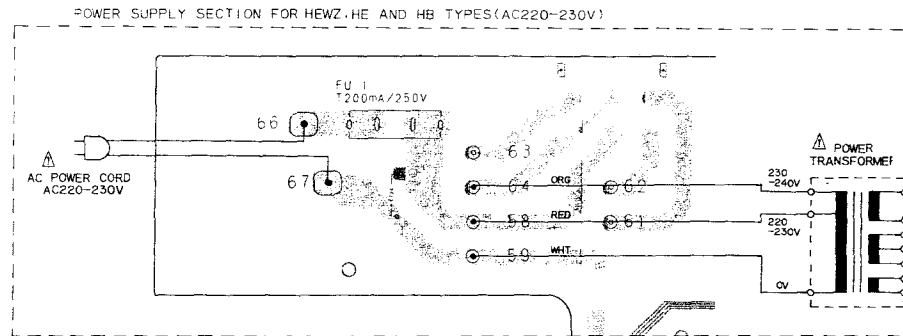






5. P.C. BOARDS CONNECTION DIAGRAM

TUNER ASSEMBLY
 (AWZ3501 For KU/CA type)
 (AWZ3317 For HEWZ and HE types)
 (AWZ3499 For HB type)
 (AWZ3500 For SD type)



1 KU/CA TYPE

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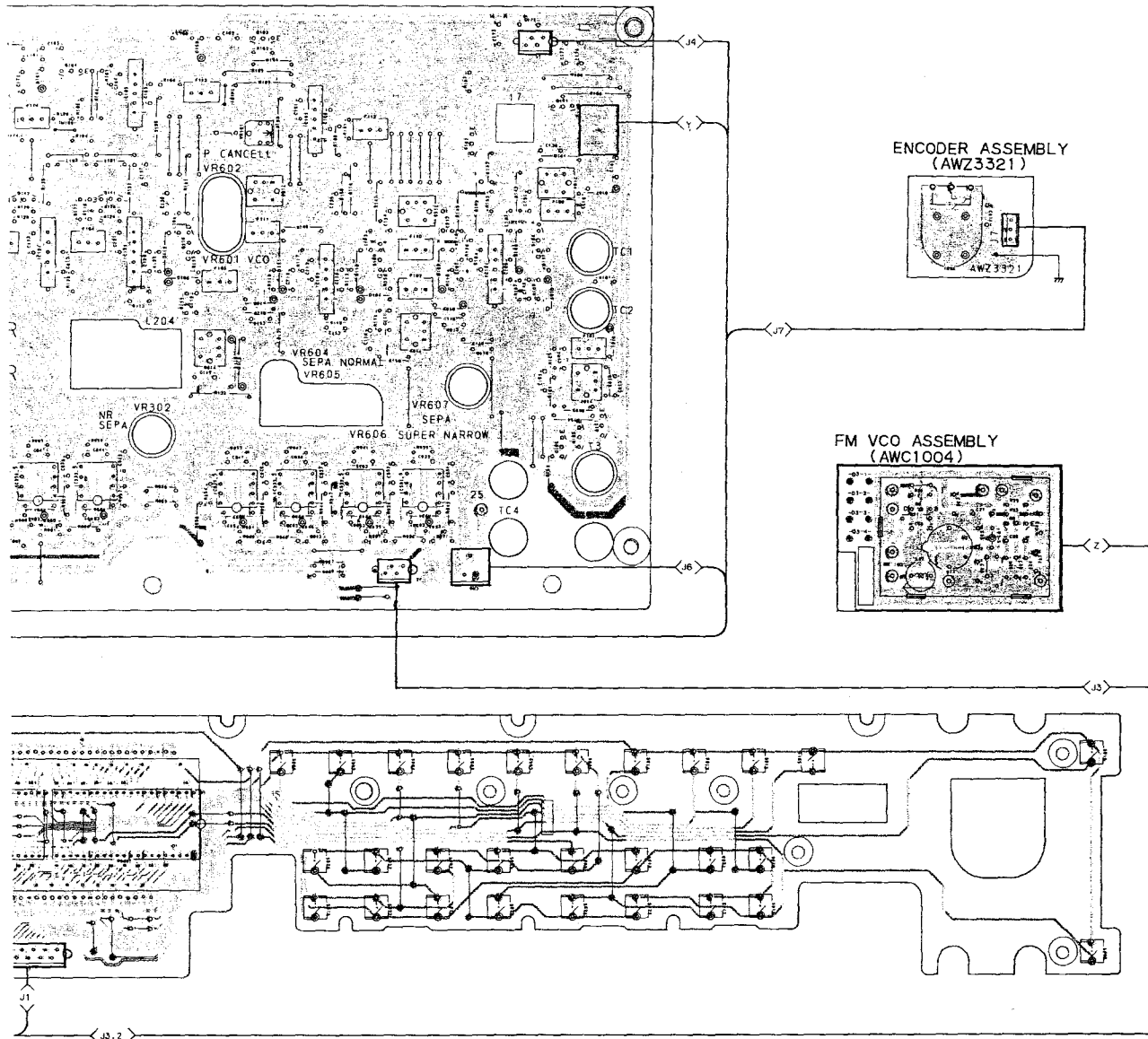
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ENCODER ASSEMBLY
(AWZ3321)

FM VCO ASSEMBLY
(AWC1004)

NOTE

1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the following Table.

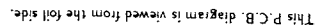
P.C.B. pattern diagram indication	Corresponding part symbol	Part Name
EC 0504		Transistor
D215		Radiator type transistor
D203		Diode
R237		Resistor
C513		Capacitor (Polarity)
C516		Capacitor (Non-polarity)

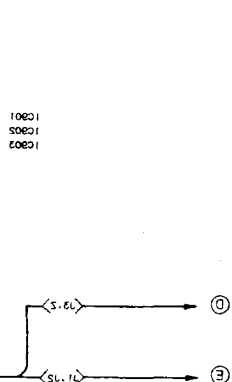
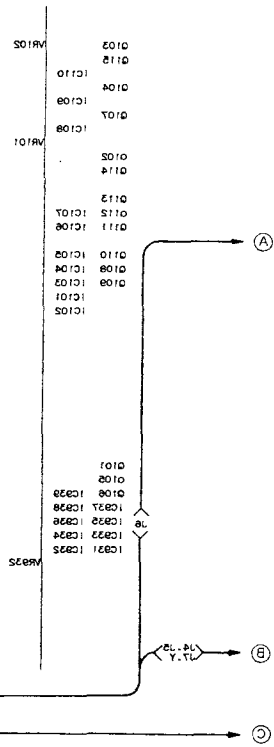
Others

P.C.B. pattern diagram indication	Part Name
IC	IC
S	Switch
RY	Relay
L	Coil
F	Filter
VR	Variable resistor or Semi-fixed resistor

3. The capacitor terminal marked with ⊖ (double circles) shows negative terminal.
4. The diode terminal marked with ⊕ (double circles) shows cathode side.
5. The transistor terminal to which E is affixed shows the emitter.

*1: Specifications for D3-1 to D3-5 are matched. If you change D3-1 to D3-4, at the same time also change FM VCO assembly. Likewise, if you change FM VCO assembly, at the same time change D3-1 to D3-4. In the case of both of the above mentioned, D3-1 to D3-4 parts are mounted on the newly ordered FM VCO assembly; use spare parts.





6. ADJUSTMENTS

Note: For connections and points to be adjusted, refer to Figs. 6-1, 6-2 and 6-3.

6.1 AM TUNER SECTION

- Press the BAND SELECT button to go to the AM mode.
- SD type only: Position the channel step switch on the rear panel to the 50 KHz/9 KHz/50 μ S position.

Step No.	Adjustment Title	AM SG (400Hz, 30% modulation)		F-93 Indication	Adjustments	
		Frequency(KHz)	Level (dBμV/m)		Adjustment Point	Specifications
1	Front End VT adjustment	No signal		530KHz (531KHz)*1	L501	Set the voltage at $2.0\pm0.2V$ between TP-17 and GND.
2				1600KHz (1602KHz)*1	TC502	Set the voltage at $16.0\pm0.2V$ between TP-17 and GND.
3	Front End sensitivity up adjustment	530KHz (531KHz)*1	Low level*3	530KHz (531KHz)*1 [NORMAL]*2	T501	Maximizes the voltage between TP-18 and the GND.
4		1600KHz (1601KHz)*1	Low level*3	1600KHz (1602KHz)*1 [NORMAL]*2	TC501	
5		Repeat steps 3 and 4 to satisfy the requirements.				
6	S meter adjustment	1010KHz (1008KHz)*1	100	1010KHz (1008KHz)*1	VR501	Set the voltage at $5.0\pm0.2V$ between TP-18 and GND.

* 1: For types HE, HB, HEWZ and SD, adjust the frequencies in the parentheses().

* 2: Press the IF BAND button to make the IF Band "Normal."

* 3: Measure the voltage between TP-18 and the GND when the AM SG "Level (dB μ V/m)" is set to 80dB μ V/m. Lower the AM SG "Level (dBm μ V/m)" until the voltage is half the original value.

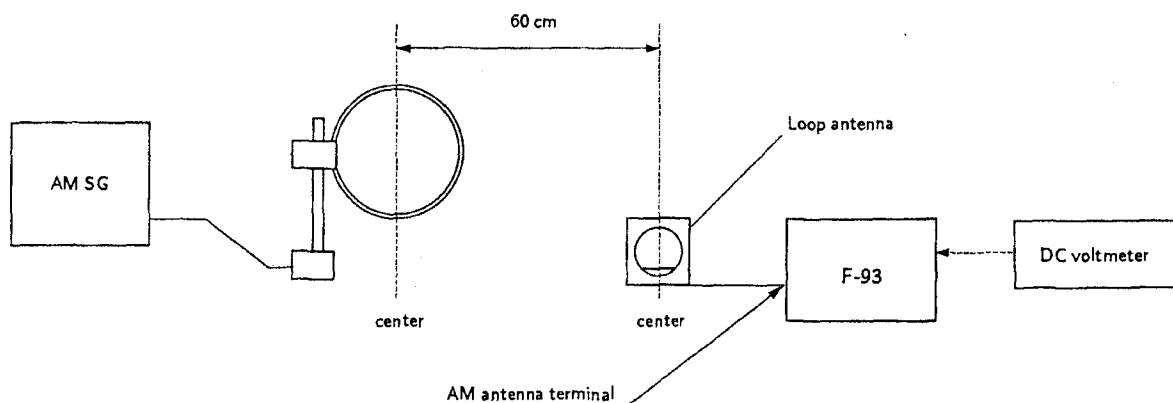


Fig. 6-1 AM Adjustment Connection Diagram

6.2 FM TUNER SECTION

- Press the Band Select button to go to the FM mode.
- Press the ANT A/B button to select the antenna terminal with the FM SG output connection.
- Press the RF ATT button to select "0dB" (RF ATT OFF).
- For adjustments without indications, turn "OFF" AUTO OPERATION, MPX NR, SSS, S-MPX and turn the MPX MODE to "AUTO".
- See page 44 regarding *4 through *10.

Step No.	Adjustment Title	FM SG (1KHz \pm 75KHz dev.)		F-93 Indication	Adjustments	
		Frequency(MHz) and condition	Level(dB μ V)		Adjustment Point	Specifications
1	Front End VT adjustment	No signal		108MHz	L18	Adjust the voltage to 20.0 \pm 0.1 V between TP-17 and GND.
2				87.5MHz	—	Confirm the voltage between TP-17 and GND is 7.1 \pm 0.6V.
3	Front End sensitivity up adjustment	90	Low level *4	90MHz [NORMAL]*6	T1,T2, T3,T4	Maximizes the voltage between TP-15 and GND.
4		106	Low level *4	106MHz [NORMAL]*6	TC1,TC2, TC3,TC4	
5		Repeat steps 3 and 4 to satisfy the requirements.				
6	IF section sensitivity up adjustment	98 [MONO]*7	Low level*5	98MHz [NORMAL]*6	T101, T102, T103	Maximize output level of Output terminal.
7				98MHz [SUPER NARROW]*6	T104, T105, T106	
8	Detector VT adjustment	98 [MONO]*7	60	98MHz [NORMAL]*6	T201-B	Adjust the voltage between TP-12 and 13 to 0 \pm 100mV.
9					T202-B	Adjust the voltage between TP-6 and 14 to 0 \pm 100mV.
10					T203	Adjust the voltage between TP-3 and 4 to 0 \pm 100mV.
11	Mono distortion adjustment [NORMAL]	98 [MONO]*7	60	98MHz [NORMAL] *6	T201-A VR203	Short between TP-1 and 2. Short between TP-10 and TP-26 (+13V). Minimize distortion (0.4% or less).
12					T202-A VR208	Short between TP-1 and 2. Short between TP-11 and TP-26 (+13V). Minimize distortion (0.4% or less).
13					While shorting between TP-1 and 2 (with TP10, 11, 26 open), if the distortion value exceeds 0.4%, adjust T201-B (and T202-B) so that the voltage between TP-12 and 13 (and between TP-6 and 14) is 0 \pm 100mV. Repeat steps 11 and 12 above.	

Step No.	Adjustment Title	FM SG (1KHz \pm 75KHz dev.)		F-93 Indication	Adjustments	
		Frequency(MHz) and condition	Level(dB μ V)		Adjustment Point	Specifications
14	Tertiary monaural distortion adjustment [NORMAL]	98 [MONO]*7	60	98MHz [NORMAL]*6	VR210	Minimize TP-7 AC output (80 mV or less).
15					VR206	Open between TP-1 and 2. Minimize distortion (tertiary) with VR206.
16					T203	Minimize distortion (secondary) with T203.
17					Repeat steps 15 and 16 if the distortion requirements are not satisfied (0.2% or greater).	
18	Tertiary monaural distortion adjustment [SUPER NARROW]	98 [MONO]*7	60	98MHz [SUPER NARROW]*6	VR207	Minimize distortion (0.4% or less).
19	Stereo distortion adjustment [NORMAL]	98 [Lch only]*8	60	98MHz [NORMAL]*6	T101, T102, T103	Adjust VR204 to center. Adjust T101, T102 and T103 within $\pm 45^\circ$ to minimize distortion.
20					VR204	Minimize distortion (0.4% or less).
21	Stereo distortion adjustment [SUPER NARROW]	98 [Lch only]*8	60	98MHz [NORMAL]*6	T104, T105, T106	Adjust VR205 to center. Adjust T104, T105 and T106 within $\pm 45^\circ$ to minimize distortion.
22		98 [Lch only]*8	60	98MHz [SUPER NARROW]*6	VR205	Minimize distortion (2% or less).
23	Separation adjustment	98 [Lch only]*8	60	98MHz [NORMAL]*6	VR604	Maximize L to R separation (45dB or greater).
24		98 [Rch only]			VR605	Maximize R to L separation (45dB or greater).
25		98 [Lch only]*8	60	98MHz [SUPER NARROW]*6	VR607	Maximize L to R separation (30dB or greater).
26		98 [Rch only]*8			VR606	Maximize R to L separation (30dB or greater).
27	Noise reduction separation adjustment	98 [Lch only]*8	60	98MHz [NORMAL]*6	VR301	Measure the output level of the output (FIXED) jacks when the MPX NR is OFF. Turn ON the MPX NR. Adjust to a level that is +1dB higher in relation to when the MPX NR is OFF. Turn OFF the MPX NR after adjusting.
28		98 [10kHz, Lch only]*9	60	98MHz [NORMAL]*6	VR302	
29	S-MPX distortion adjustment	98 [Lch only]*8	60	98MHz [SUPER NARROW]*6 [S-MPX ON]*10	VR209	Minimize the distortion (2.5% or less).

Step No.	Adjustment Title	FM SG (1KHz \pm 75KHz dev.)		F-93 Indication	Adjustments	
		Frequency(MHz) and condition	Level(dB μ V)		Adjustment Point	Specifications
30	S-MPX separation adjustment	98 [Lch only]*8	60	[SUPER NARROW]*6 [S-MPX ON]*10	VR211	Adjust to optimum separation (26dB or more).
31					VR932	
32		Repeat steps 30 and 31 if the separation requirements are not satisfied (26dB or greater).				
33	S meter adjustment	98	90	98MHz [NORMAL]*6	VR102	Adjust S meter to 85dB.
34			50		VR101	Adjust S meter to 50dB.
35			80		VR102	Adjust S meter to 80dB.

* 4 : Set the FM SG "LEVEL (dB μ V)" so that the voltage between TP-15 and GND is approx. 3V to 5V.

* 5 : Measure the output level of the output (FIXED) jacks when the input signal level from the FM antenna terminal is 60 dB μ V.

Lower the FM SG "LEVEL (dB μ V)" so that the output level decreases about 3 dB. And adjust in this state.

* 6 : Press the IF BAND button and select the IF BAND shown in the brackets [].

* 7 : Set the TONE signal mode of the MPX SG to "MONO".

* 8 : Set the TONE mode of the MPX SG to the channel shown in the brackets [].

* 9 : Set the MPX SG tone signal to 10KHz and the TONE mode to "Lch".

* 10 : Press the S-MPX button and turn ON the S-MPX.

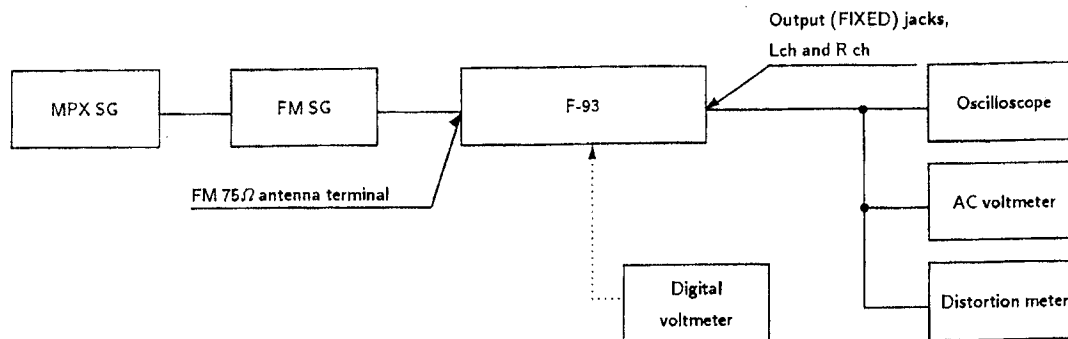


Fig. 6-2 FM Adjustment Connection Diagram

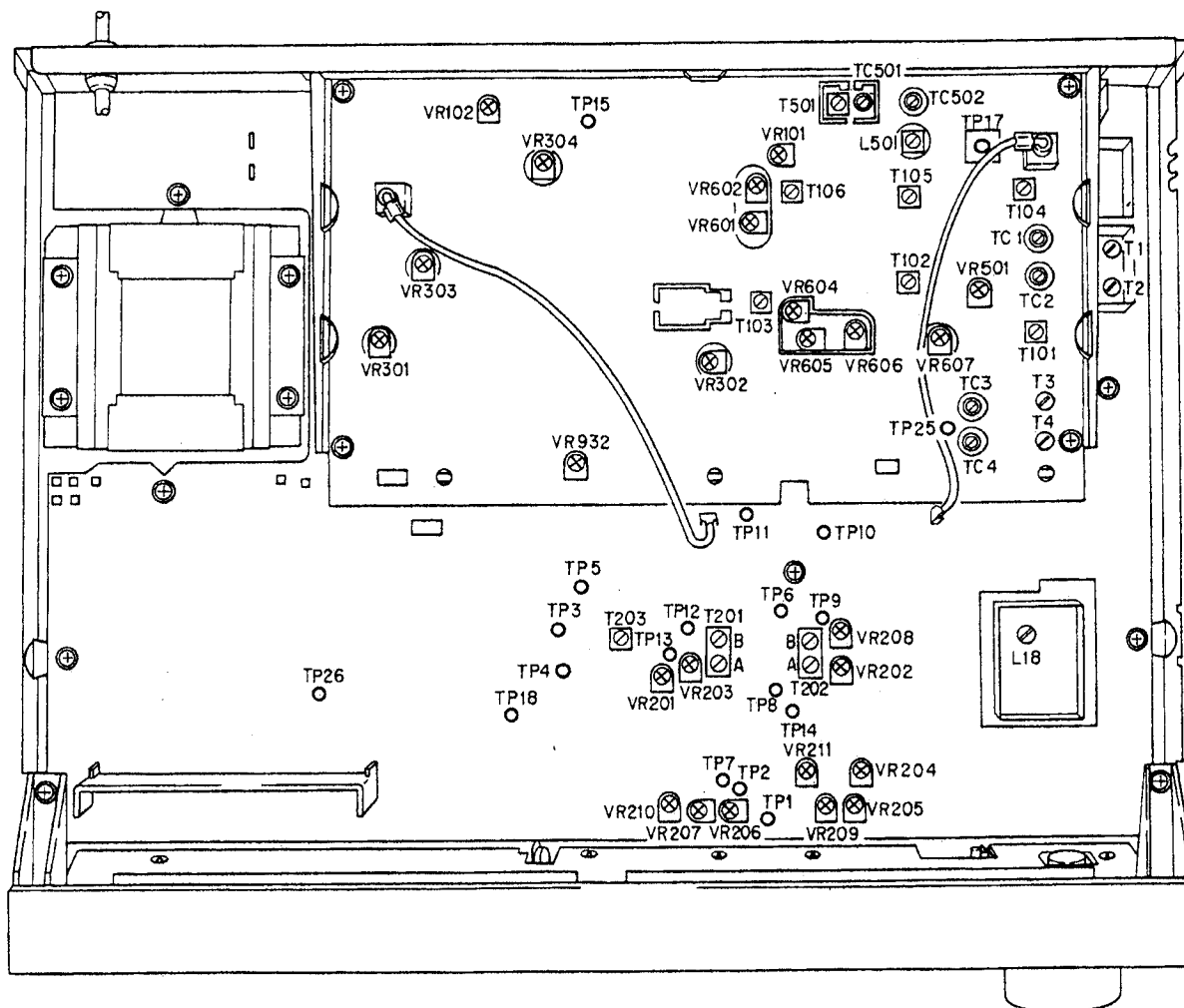


Fig. 6-3 Adjustment Points

7.IC INFORMATION

● PD5161A(TUNER CONTROL μ -COM)

Pin Function

No.	Pin name	I/O	Function	Active
1	PMUT	O	Power source mute	H
2	10K/9K	I	AM step switcher, FM step switcher	H/L
3	ROT A	I	Rotary encoder input	H/L
4	ROT B	I		H/L
5	FM SM	I	FM S meter input	—
6	AM SM	I	AM S meter input	—
7	NOISE/RST	I/O	Noise input/ reset output	—/L
8	STOP	I	Auto-stop input	L
9	MUTE	O	Mute output	H
10	MONO	O	Forced monaural output	H
11	FM+B/AM+B	O	FM+B output/ AM+B output	H/L
12	KEY IN ϕ	I	Key input ϕ	L
13	ATT2	O	RF ATT control	H/L
14	ATT1	O		H/L
15	AC IN	I	AC input	—
16	POWER IND	O	Power indicator output (standby)	L
17	STEREO IN	I	Stereo input	L
18	NR	O	Noise reduction output	H
19	SSS	O	SSS output	H
20	S-MPX	O	S-MPX output	H
21	REM IN	I	Remote control input	H/L
22	CN V _{SS}	—	GND	—
23	RESET	I	Reset input	L
24	Xin	I	Oscillator input	H/L
25	Xout	O	Oscillator output	H/L
26	V _{SS}	—	GND	—

No.	Pin name	I/O	Function	Active
27	SELECT	I	F-93/F676 switching	L
28	KEYIN 1	I	Key input 1	L
29	KEYIN 2	I	Key input 2	L
30	KEYIN 3	I	Key input 3	L
31	KEYIN 4	I	Key input 4	L
32	KEYIN 5	I	Key input 5	L
33	KEYIN 6	I	Key input 6	L
34	KEYIN 7	I	Key input 7	L
35	S NARROW	O	Super narrow	L
36	NORMAL	O	Normal	L
37	FL AC	O	FL switch	L
38	POWER	O	Power output	L
39	ANT A/B	O	Antenna AB switching	H/L
40	KEYOUT 4	O	Key output	L
41	KEYOUT 3	O		L
42	KEYOUT 2	O		L
43	KEYOUT 1	O		L
44	TEST	I	Test data (for production)	L
45	LC7570③	O	LC7570 ③ enable	H
46	LC7570②	O	LC7570 ② enable	H
47	FL BLANK	O	FL blanking (light off)	L
48	LC7570①	O	LC7570 ① enable	H
49	PLL CE	O	PLL (CX7975B) chip enable	L
50	CLK	O	Clock (serial transmission)	H
51	DATA	O	Data (serial transmission)	H
52	V _{CC}	—	+5V power source	—

● CXA1355L(VHF-UHF TUNER)

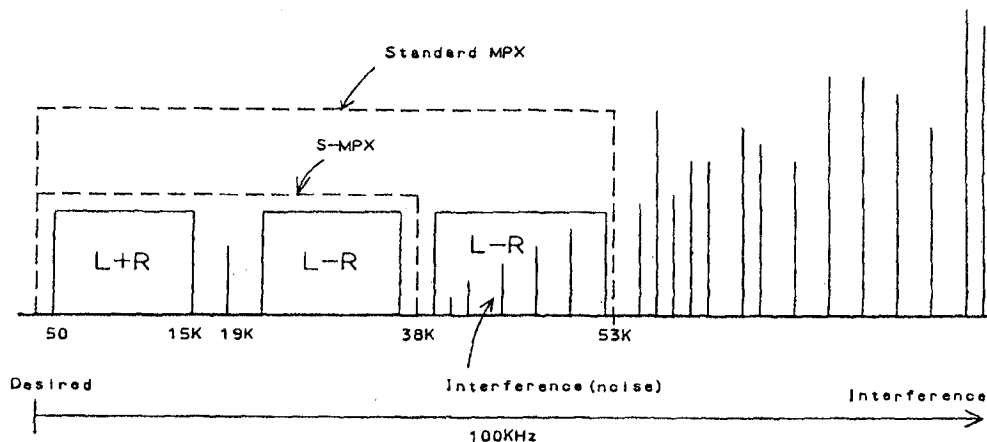
Pin Function

No.	Pin name	Function
1	IF OUT	IF output terminal
2	MIX OUT1	Mixer output and IF Amp input
3	MIX OUT2	
4	VHF IN1	VHF input terminal. Normally, pin ④ is grounded with the capacitor and input to pin ⑤.
5	VHF IN2	
6	GND	GND terminal
7	OSC OUT/ SW	OSC output for PLL and U/V switching terminal. Connected to 9V via a resistance of approx. 5 KOhms for VHF reception. Connected to 0V (OPEN) for UHF reception.
8	V OSCB	VHF oscillator. Pin ⑩ is an open collector. Connected to the power source via a resistance of approx. 500 Ohms or a choke coil.
10	V OSCC	
9	VCC	Power source terminal (9V).
11	UHF IN1	UHF input terminal. Input to pin ⑪ and ⑫ by differential.
12	UHF IN2	
13	GND	GND terminal
14	U OSCC	UHF oscillator. Pin ⑭ is an open collector connected to the power source via a resistance of approx. 500 Ohms or a choke coil.
15	U OSCB1	
16	U OSCB2	

8. CIRCUIT DESCRIPTION

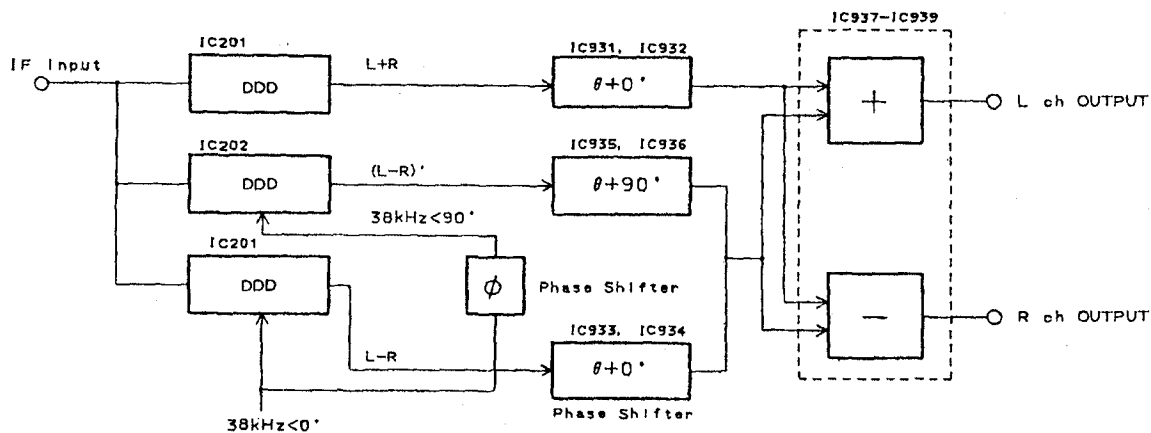
• S-MPX circuit

The S-MPX is a circuit for eliminating the ultra-close interference that cannot be removed with the standard MPX demodulator. It can minimize the beat noise caused by adjacent stations (100kHz to 200kHz) with FM stereo reception.



Because the standard type MPX has a demodulation band up to 53 KHz, it is affected by interferences. However, the S-MPX (Single Side-band MPX) has a demodulation band up to 38 KHz and is thus not affected by interferences.

Block Diagram



9. FOR HEWZ, HE, HB AND SD TYPES

9.1 CONTRAST OF MISCELLANEOUS PARTS

NOTES:

- Parts without part number cannot be supplied.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

HEWZ, HE, HB and SD types are the same as the KU/CA type with the exception of the following sections.

Mark	Symbol & Description	Part No.					Remarks
		F-93/KU/CA	F-93/HEWZ	F-93/HE	F-93/HB	F-93/SD	
●	TUNER assembly	AWZ3501	AWZ3317	AWZ3317	AWZ3499	AWZ3500	
	FL filter	AAK1300	AAK1299	AAK1299	AAK1299	AAK1300	
	Connection cord with mini plug	ADE-085	.....	.....	.....	ADE-085	
⚠	AC power cord	ADG1057	ADG1010	ADG1021	ADG1085	ADG1015	
	FM antenna	ADH-005	.....	.....	.....	ADH-005	
	FM antenna assembly	.....	ADH1002	ADH1002	ADH1002	.....
⚠	FU1 Fuse (T200mA/250V)	.....	AEK-502	AEK-502	AEK-502	AEK-502	
	Packing case	AHD2063	AHD2061	AHD2061	AHD2061	AHD2061	
	Antenna adaptor	AKX-080	.....	.....	.....	AKX-080	
	Front panel	ANB1469	ANB1442	ANB1442	ANB1442	ANB1469	
	Door panel	ANB1468	ANB1443	ANB1443	ANB1443	ANB1443	
	PVC panel	AAK2191	AAK2187	AAK2191	AAK2191	AAK2191	
	Operating instructions (English)	ARB1328	.....	.....	ARB1328	ARB1328	
	Operating instructions (German)	.....	ARC1290	.....	.....	.....
	Operating instructions (English/French/German/ Italian/Swedish/Dutch/ Spanish/Portuguese)	.....	.....	ARE1208	.....	.....
⚠	Power transformer(T701)	ATT1156	ATT1158	ATT1158	ATT1158	ATT1157	
	Screw	.....	.....	.....	.....	PBZ40P080FZK	

TUNER ASSEMBLY(AWZ3317, AWZ3499, AWZ3500)

The TUNER assembly (AWZ3317, AWZ3499, AWZ3500) is the same as the TUNER assembly(AWZ3501) with the exception of the following sections.

Mark	Symbol & Description	Part No.				Remarks
		AWZ3501	AWZ3317	AWZ3499	AWZ3500	
	C531	.....	CKDYX473M25	.....	.....
	C601, C602	CQSXA222J160	CQSXA152J160	CQSXA152J160	CQSXA152J160	
	C618, C619, C625, C626	CQMXA822J100	CKDYB332K50	CQMXA822J100	CQMXA822J100	
	C620, C624, C627, C628	.....	ACG-037	.....	.....
	C632, C633	.....	.....	.....	CQSXA751J160	
	C638- C641	.....	CKDYB472K50	.....	.....
	C642- C645	.....	CKDYX473M25	.....	.....
	C724	.....	ACG1002	.....	.....
	C810	CCDSL101J50	.....	.....	CCDSL101J50	
	D808, D809	1S5252	.....	.....	1S5252	
	L602- L609	.....	LAU010M	.....	.....
	Q604, Q605	.....	.....	.....	2SK246	
	Q804	2SC2603	.....	.....	2SC2603	
	R40, R41	RD1/2PM103J	.....	.....	.....
	R638, R639	.....	.....	.....	RD1/8PM105J	
	R732	ACN-208	.....	.....	.....
	R733- R735	RS3LMF120J	.....	.....	.....
	R803	.....	RD1/8PM223J	RD1/8PM223J	.....
	R822	RD1/8PM472J	.....	.....	RD1/8PM472J	
	R826	RD1/8PM104J	.....	.....	RD1/8PM104J	
	R830	RD1/8PM224J	.....	.....	RD1/8PM224J	
	R831	RD1/8PM101J	.....	.....	RD1/8PM101J	
	R832	RD1/8PM102J	.....	.....	RD1/8PM102J	
	R833	.....	RD1/8PM104J	RD1/8PM104J	.....
	S701 Slide switch	.....	.....	.....	AKX-505	
⚠	S601 Voltage selector	.....	.....	.....	ASH1009	
	Jack	AKN1006	.....	.....	AKN1006	

9.2 LINE VOLTAGE SELECTION (For HE, HB and HEWZ types)

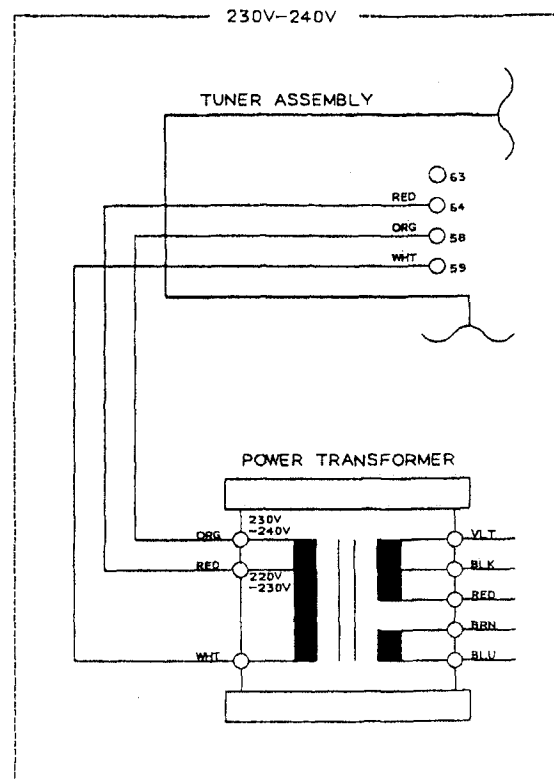
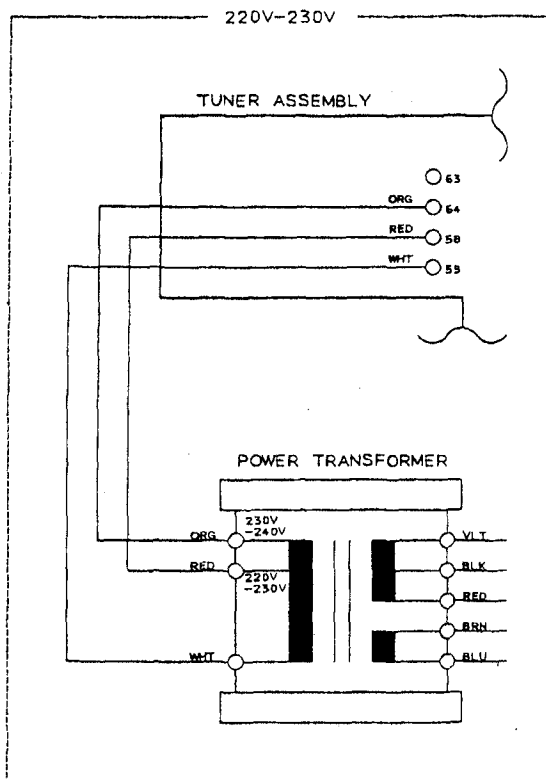
Line voltage can be changed with the following steps.

1. Disconnect the AC power cord.
2. Remove the bonnet.
3. Change the connection of the power transformer lead wires as follows.

Voltage	Terminal No. 58	Terminal No. 64
220V-230V	RED wire	ORG wire
230V-240V	ORG wire	RED wire

4. Stick the line voltage label on the rear panel.

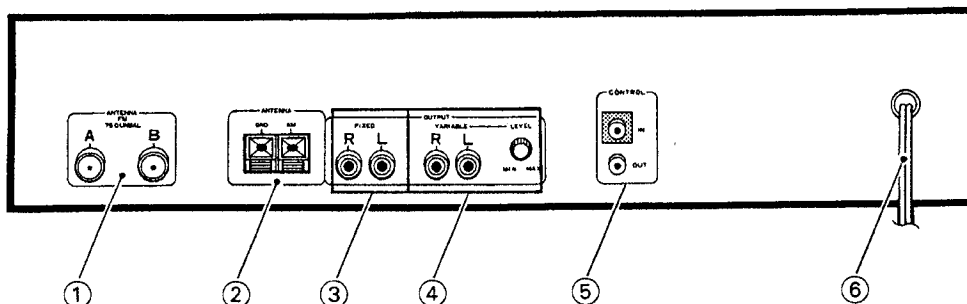
Part No.	Description
AAX-193	220V label
AAX-192	240V label



10. PANEL FACILITIES

REAR PANEL FACILITIES

Illustration not applicable to U.K. model.



① FM ANTENNA jacks

Connect to the accessory FM T-type antenna cord or a separately purchased FM antenna. There are two jacks, A and B, so you can connect two antennas pointing in different directions towards different broadcasting stations.

② AM ANTENNA terminals

Connect to the accessory AM loop antenna or a separately purchased AM antenna.

③ OUTPUT (FIXED) jacks

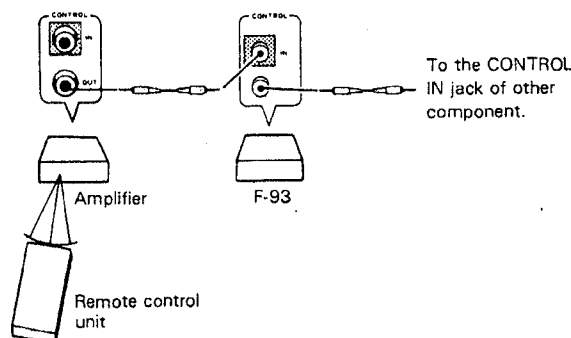
Connect to a stereo amplifier's TUNER jacks. Signals are output at a fixed level.

④ OUTPUT (VARIABLE) jacks and LEVEL knob

Connect to a stereo amplifier's TUNER jacks. Signal output level from these jacks is controlled by the level adjustment knob, so you can adjust accordingly to match the level of other components connected to the stereo amplifier.

⑤ CONTROL jacks (U.S., Canadian and Multi-voltage models only)

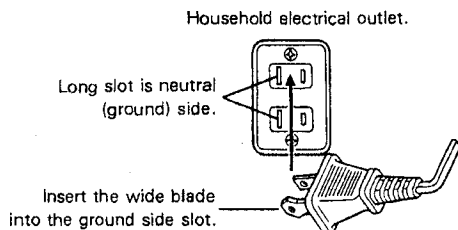
IN/OUT jacks for Pioneer remote control signals. The basic functions of this tuner can be operated from the remote control unit supplied with Pioneer amplifiers bearing the **SR** mark.



⑥ Power cord

CONNECTING THE POWER CORD (For U.S. and Canadian models)

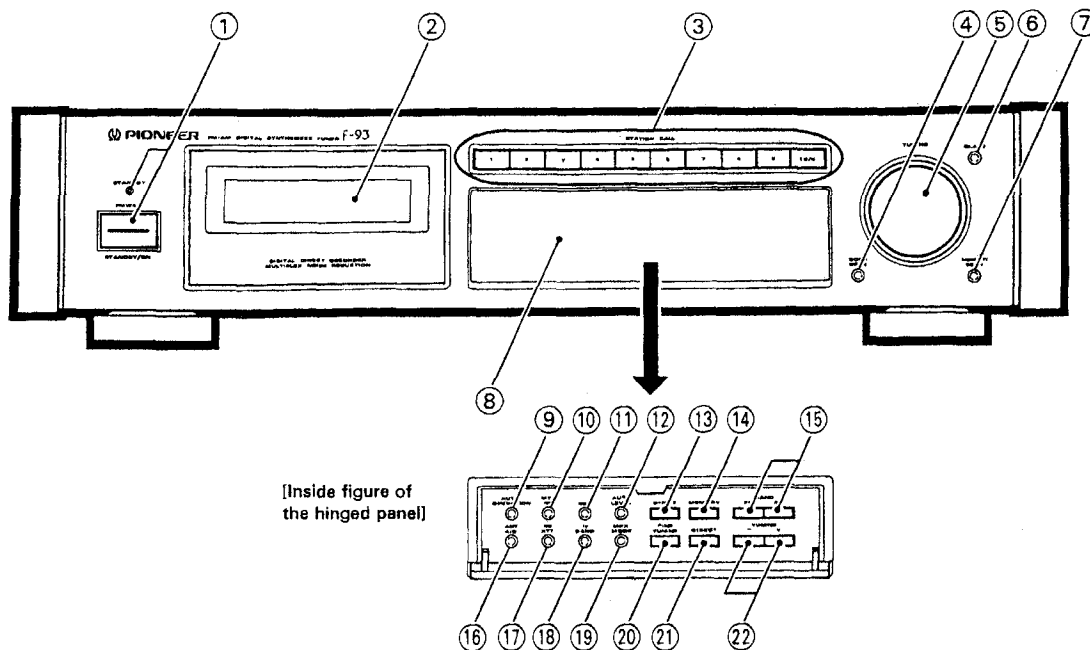
Household electrical outlets are provided with specific polarity, a live side and a neutral (ground) side. This unit utilizes such polarity in order to improve sound quality. As shown in the illustration, be sure to insert the power plug so that its blades match the width of slots in the outlet.



POWER-CORD CAUTION

Handle the power cord by the plug. Do not pull out the plug by tugging the cord and never touch the power cord when your hands are wet as this could cause a short circuit or electric shock. Do not place the unit, a piece of furniture, etc., on the power cord, or pinch the cord. Never make a knot in the cord or tie it with other cords. The power cords should be routed such that they are not likely to be stepped on. A damaged power cord can cause fire or give you an electrical shock. Check the power cord once in a while. When you find it damaged, ask your nearest PIONEER authorized service center or your dealer for a replacement.

FRONT PANEL FACILITIES



[Inside figure of
the hinged panel]

① POWER STANDBY/ON switch/indicator

This is the switch for electric power.

ON: When set to the ON position, power is supplied and the unit becomes operational.

STANDBY: When set to STANDBY position, the main power flow is cut and the unit is no longer fully operational. A minute flow of power feeds the unit to maintain operation readiness.

The STANDBY indicator lights when the power is STANDBY, and goes out during ON.

NOTE:

- As long as the power cord is connected to the outlet, the memory continues to be protected.
- If the power cord is unplugged, the memory will be retained for several days.

② Operation display

See page 10.

③ STATION CALL buttons

Use these buttons to preset stations and to receive already preset stations.

They are also used when performing direct access tuning.

④ DOOR OPEN button

Use to open the hinged panel door.

⑤ TUNING knob

Use for manual tuning. To raise the frequency, turn in a clockwise direction; to lower the frequency, turn counterclockwise.

⑥ CLASS button

Use to switch between preset memory classes 1 to 4. In each class, one station can be memorized in each of the 1 to 10 STATION CALL buttons, enabling a total of 40 stations to be memorized.

⑦ MEMORY SCAN button

Press to receive currently selected class and preset stations for a few seconds in sequence. Press again and reception of the station presently being received will continue.

⑧ Hinged panel door

[INSIDE THE HINGED PANEL]

⑨ AUTO OPERATION button

Press this button, and the unit automatically switches between the following modes to find the one for optimum reception.

- RF ATT (10/15/20/0)
- ANT A/B
- IF BAND (NORMAL/SUPER NARROW)
- MPX NR (ON/OFF)
- MPX MODE (AUTO/MDNO)

Automatically switches to mono in case of interference.

Muting turns on automatically if signal is weak.

⑩ MPX NR button

When MPX NR is on, MPX NR indicator lights up.

During reception of stereo broadcasts where the signal is weak, set this to ON if noise is a problem. Noise will be suppressed and sound quality will become clearer.

NOTE:

- If MPX NR is turned on during FM reception, the MPX MODE automatically switches to AUTO.
- This button's status is preset for each station in station memory.
- This does not operate during AM signal reception or when the broadcast is monaural.

⑪ SSS button

When SSS is on, SSS indicator lights. If turned on during reception of AM or when during reception of a monaural broadcast, this will produce a simulated stereo effect which provides rich ambience.
SSS: Spectrum Simulated Stereo.

NOTE:

- If SSS is turned on during FM reception, the MPX MODE automatically switches to MONO.
- This button's status is preset for each station in station memory.

⑫ AUTO LEVEL button

This lets you select from among six signal threshold levels, to determine the received signal level above which Auto Tuning will detect a station and stop. The Signal Indicator and Station/Signal display indicate the set level. If the station's signal level is lower than the set threshold level, tuning will not stop at that station. Press once and the current level is displayed. Each subsequent time the button is pressed, the level changes in order.

⑬ S-MPX button

Switch ON when adjacent stations interfere with FM stereo reception even when the IF BAND is in the SUPER NARROW position. Switching this on also automatically selects the SUPER NARROW IF BAND, and AUTO MPX MODE.

NOTE:

- S-MPX only operates during FM stereo reception.
- The setting of this button is memorized together with the station in the station presets.

⑭ MEMORY button

Press to memorize preset stations. The MEMORY indicator will remain lit for several seconds. While the indicator is lit, select the class you want to memorize with the CLASS button, and press the STATION CALL button (1 through 10/0) you want to memorize.

⑮ BAND selector buttons**FM:**

Press to receive FM broadcasts.

AM:

Press to receive AM broadcasts.

⑯ ANT A/B button

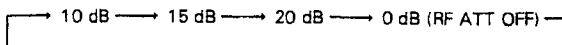
Selects between two antennas connected to the FM antenna A and B terminals. ANT-[A] or ANT-[B] indicator lights up.

NOTE:

This button's status is preset for each station in station memory.

⑰ RF ATT button

Use when FM reception is too strong, resulting in a distorted sound. The RF ATT indicator lights, and the set attenuator level is indicated in the station/signal display. Press once and the current level is displayed. Each subsequent time the button is pressed, the level changes in the following order:



Normally, this button should be set to 0.

NOTE:

This button's status is preset for each station in station memory.

⑱ IF BAND button

Each time this button is pressed the bandwidth of the IF circuit switches between "normal" and "super narrow" for the FM band and the AM band.

The selected bandwidth is displayed as follows:

The NORMAL or SUPER NARROW indicator lights up.

Set to SUPER NARROW in case of interference from other stations.

NOTE:

The setting of this button is memorized together with the station in the station memory.

⑲ MPX (multiplex) MODE button

Mode changes as follows each time this button is pressed:



This button does not affect AM reception.

• AUTO:

AUTO indicator lights up.

Depending on the broadcast station, STEREO or MONO is automatically selected.

STEREO indicator lights up when a FM stereo broadcast is received.

NOTE:

When the signal level is too weak for reception, sound output is automatically muted.

• MONO:

MONO indicator lights up.

To receive stereo broadcasts in monaural.

If there is a lot of noise during stereo reception of a weak signal, you can reduce the level of noise by switching to MONO.

NOTE:

The setting of this button is memorized together with the station in the station memory.

⑳ FINE TUNING button

Use this when sound is distorted owing to radio interference even though you are tuned to your desired frequency. When FINE TUNING is operating, the FINE indicator lights.

During FM reception, the frequency is changed in 10 kHz steps. (When FINE TUNING is off, it changes in 50 kHz or 100 kHz steps.)

By changing the frequency slightly with the TUNING (+, -) button, noise caused by interference can be minimized.

NOTE:

- When FINE TUNING is on and no station is being received, muting is applied automatically to prevent noise. Muting is not applied when a station is received, even if there is much noise and interference.
- Stations tuned using FINE TUNING can be preset.

㉑ DIRECT button

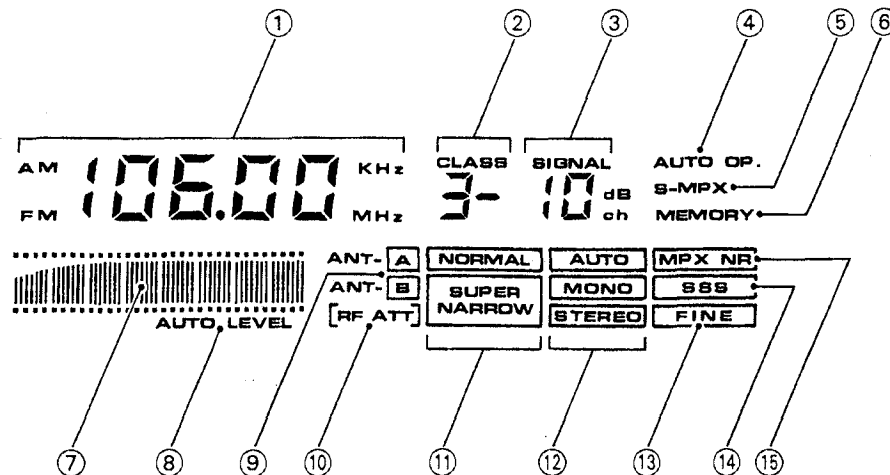
When this button is pressed, the STATION CALL buttons function as ten-key number buttons for direct input of the desired reception frequency.

When FINE TUNING is on during FM reception, frequencies can be specified in 10 kHz steps. If FINE TUNING is off, frequencies can be specified in 50 kHz or 100 kHz steps.

㉒ TUNING (+, -) buttons

If you press and immediately release the button, the frequency changes a step at a time. If you keep the button depressed for a few moments before releasing it, then auto-tuning operates and stops at the first station received.

You can set the signal level you want to be regarded as a station with the AUTO LEVEL button.

[Operation display]

① Frequency indicator

shows reception band and frequency.

② CLASS indicator

Shows preset memory class 1—4.

③ SIGNAL level/STATION No./RF ATT level/AUTO LEVEL indicator.

- After performing Manual tuning, Auto tuning, or Direct tuning, "SIGNAL" lights, and signal strength is displayed.
- When recalling a station preset in a STATION CALL button, STATION is displayed. If you press the STATION CALL button of the recalled station once more, "SIGNAL" lights, and the received signal strength is displayed for several seconds.
- During RF ATT operation, the attenuation level is displayed for several seconds.
- When setting AUTO LEVEL, the auto stop level is displayed for several seconds.

④ AUTO OP. indicator

This lights when AUTO OPERATION is operating.

⑤ S-MPX indicator

This lights when S-MPX is ON.

⑥ MEMORY Indicator

Lights for a several seconds when MEMORY button is pressed.

⑦ Signal indicator

When setting AUTO LEVEL, the reception level step is displayed.

⑧ AUTO LEVEL indicator

This lights when setting AUTO LEVEL.

⑨ ANT- [A] , ANT- [B] indicators

These indicate the selected antenna.

⑩ RF ATT indicator

Lights when RF ATT of 10 dB, 15 dB, or 20 dB has been selected.

⑪ NORMAL, SUPER NARROW indicators

These indicate the selected IF BAND mode.

⑫ AUTO, MONO, STEREO, indicators

AUTO/MONO: Indicates the selected MPX mode.

STEREO: When the MPX mode is switched to AUTO, this lights when an FM stereo broadcast is received.

⑬ FINE indicator

This lights when the FINE TUNING button is pressed to change the frequency in 10 kHz steps during FM reception.

⑭ SSS indicator

This lights when SSS (Spectrum Simulated Stereo) is ON.

⑮ MPX NR indicator

This indicator lights when the MPX NR is operating.

11. SPECIFICATIONS

FM Tuner Section

Frequency range	87.5 MHz to 108 MHz
Usable Sensitivity	
NORMAL	Mono: 11.2 dBf, IHF (1.0 μ V/75 Ω)
50 dB Quieting Sensitivity	
NORMAL	Mono: 15.9 dBf, IHF (1.7 μ V/75 Ω)
	Stereo: 36.2 dBf, IHF (17.7 μ V/75 Ω)
Sensitivity (DIN)	
NORMAL	Mono: 0.8 μ V/75 Ω
	Stereo: 26 μ V/75 Ω
Signal-to-Noise Ratio	Mono: 96 dB (at 80 dBf)
	Stereo: 88 dB (at 80 dBf)
Signal-to-Noise Ratio (DIN)	Mono: 76 dB
	Stereo: 73 dB
Distortion (at 80 dBf)	
NORMAL	Mono: 0.03 % (1 kHz)
	Stereo: 0.04 % (1 kHz)
SUPER NARROW	Mono: 0.2 % (1 kHz)
	Stereo: 0.25 % (1 kHz)
Capture Ratio	
NORMAL	1 dB
Alternate Channel Selectivity	
NORMAL	85 dB (400 kHz)
SUPER NARROW	85 dB (300 kHz)
Stereo Separation	60 dB (1 kHz)
	50 dB (20 Hz to 10 kHz)
Frequency Response	20 Hz to 15 kHz (± 0.5 dB)
Image Response Ratio	90 dB
IF Response Ratio	100 dB
AM Suppression Ratio	80 dB
Spurious Response Ratio	90 dB
Subcarrier Product Ratio	60 dB
Muting Threshold	23.2 dBf — 61.2 dBf (6 step)
Antenna Input	75 Ω unbalanced

AM Tuner Section

Frequency range	530 kHz to 1,700 kHz (Step 10 kHz)
	531 kHz to 1,602 kHz (Step 9 kHz)
Sensitivity (IHF, Loop antenna)	150 μ V/m
Selectivity	40 dB
Signal-to-Noise Ratio	50 dB
Image Response Ratio	40 dB
IF Response Ratio	60 dB
Antenna	Loop Antenna

Audio Section

Output (Level/Impedance)	
[FIXED]	
FM (100% MOD)	1,000 mV/0.5 k Ω
AM (30% MOD)	220 mV/0.5 k Ω
[VARIABLE]	
FM	1,200 mV MAX
AM	264 mV MAX

Miscellaneous

Power requirements	
U.K. model	a.c. 240 Volts ~, 50/60 Hz
U.S., Canadian models	AC 120 V, 60 Hz
Multi-voltage model	AC 110 V/120 — 127 V/220 V/240 V
	(switchable), 50/60 Hz
Power Consumption	30 W
Dimensions	420 (W) x 106 (H) x 327 (D) mm
	16-1/2 (W) x 4-3/16 (H) x 12-7/8 (D) in
Weight (without package)	6.5 kg (14 lb 3 oz)

Furnished Parts

[U.K. model]	
FM T-type Antenna	1
AM Loop Antenna	1
Connecting Cord with Pin Plugs	1
Operating Instructions	1
[Other destination models]	
FM T-type Antenna	1
AM Loop Antenna	1
Connecting Cord with Pin Plugs	1
Control Cord with Pin Plugs	1
Antenna Adaptor (300 Ω — 75 Ω)	1
Operating Instructions	1

NOTE:

Specifications and design subject to possible modification without notice due to improvements.